Collecting household level data on varietal diversification and adaptation strategies to climate change in East Africa

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Photo: Bioversity/Jeske van de Gevel

Table of content

Introduction

This training manual presents the objectives, tools and approaches used to train a field team for the survey on socio-economic and environmental factors that lead to farmers' vulnerability as part of a project entitled "*Linking genetic vulnerability to loss of resilience to adapt to climate change*". The survey was conducted between June – October 2013 in CCAFS benchmark sites of Nyando and Makueni in Kenya and in Hombolo district in Tanzania.

This training manual gives suggestions for field coordinators and researchers who have to train survey teams in field sites on how to collect data from rural households and communities. The methodology was developed and tested in research areas in East Africa. The training manual provides suggestions for training but you as a trainer might need to modify the approach based on your specific situation.

Acknowledgements

Parts of this manual are adapted from the CCAFS Training manual for the IMPACTlite survey (M.C.Rufino, C.Quiros et al. 2012) and the training manual for the CCAFS Baseline Household Level Questionnaire (CCAFS Household Baseline Survey 2010-12, Climate Change, Agriculture and Food Security). Certain questions we used are derived from aforementioned surveys.

These manuals and the methodology it describes are tested in field conditions in 2013 with the help of many people. We would like to thank the chiefs and assistant chiefs of the research sites for their cooperation and help in conducting the field work. Without their help it would have been impossible to find people willing to participate in our research. We also acknowledge the great contribution our enumerators made not only to the work (collecting the data) but also for their inputs during the training and the subsequent improvements we made to our methodology.

We thank CCAFS and their field staff in Kisumu and Wote (Joash Mango, Mildeva Azenath, Justus Ngesu and others) for facilitating our work. We also thank staff members David Kuria and Jackline Wawira from ABCIC for their help coordinating our fieldwork. And last but not least we are very grateful to Dominic Tumbo (Bioversity International) who has shared his extensive experience and has proved to be an outstanding field coordinator during our fieldwork in Nyando and Wote.

We thank Camilla Zanzanaini for her helpful suggestions to improve the quality of this manual.

The Seeds for Needs approach

'Seeds for Needs' is a series of projects carried out in different locations across the world. It aims at building resilient and adaptable farming systems by exposing farmers to more crop varieties, increasing farmer's knowledge about different traits and strengthening local seed systems. Scientists, local partners and farming communities are exchanging knowledge, experiences and technologies. 'Seeds for Needs' uses different methods and tools based on local needs but works towards one common goal: to decrease vulnerability in smallholder farming communities by increasing the intraspecific diversity of commonly used crops.

Agriculture plays an important part in East Africa's economy. Many smallholder farmers in Kenya, Tanzania, Ethiopia, Rwanda and Uganda are increasingly aware of the negative effects that changing climatic conditions have on crop productivity and their ability to sustain their livelihoods from farming. Growing more varieties of the same crop, all with their unique combination of traits will help a farmer spread risk. It can function as a natural form of insurance against climate risks through choosing the right combination of varieties and crops for their capacity to withstand heavy rains and wind, have good yields at higher temperatures or choosing varieties which mature earlier. Farmers are actively employing varietal diversification strategies to adapt to progressing climate change.

Varieties are available in farmer's fields and in genebanks in the form of germplasm and seeds, but accessing those varieties remain a challenge. Our research aims to answer the following questions: which seeds are able to perform well in which environment and under which conditions? Do the crops and the varieties have traits that give them the ability to adapt to climate change and at the same time meet the needs of farmers? How can we select varieties within existing sources; landraces grown on farmer's fields elsewhere which resemble future conditions or which are stored in national genebanks and have the traits that farmers are looking for? And how can we make these seeds available to farmers in a cost-effective and sustainable way?

'Seeds for Needs' tries to provide answers to these questions by selecting and testing germplasm in different environmental conditions. Combining socioeconomic and (bio)climatic data, measurements of inter and intraspecific diversity, trial data and crop modeling will provide researchers and farmers with suggestions on crop varieties and their options for use in climate change adaptation.

Some of our findings

From our trials we found out that there is a high variability in crop varieties in their ability to adapt to local climatic conditions. By planting a large number of different varieties we are learning more on how climatic conditions affect a variety in terms of maturity, susceptibility to pests and diseases, morphological characteristics and more.

By surveying farmers in different locations across East Africa we are gaining insights in farmers' preferences in selecting varieties. Farmers are selecting varieties based on aroma, adaptability to marginal areas and soils, early maturity, taste and colour, market value, threshability, resistance to pest and diseases, medicinal value, cooking time and more. From our survey we found out that the different uses and traits are not homogenous but vary across gender, class and age.

In focus group discussions farmers have indicated that they are shifting to different varieties and crops to deal with the effects of climate change. They perceive that rainfall has become less predictable and droughts more frequent. Farmers are planting more sorghum and pearl millet in Tanzania because they are more drought tolerant. Farmers are looking for early maturing varieties and are experimenting with early planting.

Examples of activities in East Africa

- The creation of an atlas of crop suitability using accession location data to predict the environment under which an accession or a group of accessions can grow.
- On-farm inter and intraspecific diversity assessments. Understanding adaptation and risk management strategies of farmers to climate change through gender disaggregated household surveys and focus group discussions.
- Introducing germplasm from genebanks to farmers fields to test their suitability for climate change adaptation using a system of on-station and on-farm trials.
- Measuring crop performance in multi-location trials.
- Participatory variety selection and understanding farmers' preferences in selecting their varietal portfolio.
- Modeling selected crops to determine yield outcomes and stability under variable weather. Model household income from crops using different diversification approaches. Model the potential for pest and diseases under different climate models.
- Capacity building of local partner organizations, national agricultural research organizations, genebank managers and staff, field personnel.

Contextualizing the project

The African Biodiversity Conservation and Innovation Centre in collaboration with Bioversity International have conducted a survey as part of their joint project entitled "Linking genetic vulnerability to loss of resilience to adapt to climate change". The project will produce insights on the potential of varietal diversification strategies in Climate Change Agriculture and Food Security (CCAFS) benchmark sites in Kenya and in research sites in Tanzania, allowing for comparisons between sites ("what works where and why"). The project will assess levels of diversity of different major crops in benchmark sites in the two countries, assess the current vulnerability of varieties and varietal portfolios, and identify varietal diversification needs and opportunities. Based on this information, varietal diversification strategies will be designed and tested in the field, introducing existing landrace and improved materials to farmers.

Purpose of the survey

This survey will collect data at the household-level on farm resources, perceptions to climate change, intra specific diversity of sorghum, pigeon pea and cowpea varieties, seed sources and adaptation strategies. In addition to individual household interviews data on village/regional level has been collected through the use of focus group discussions.

The main objective of the survey is to understand cultural knowledge and traditional farming practices that communities use to recover, mitigate and manage agricultural risks and climate change related calamities and to examine the inter and intraspecific diversity on farms. The survey will provide information on the socio-economic and environmental factors that lead to farmers' vulnerability, assess farmers' perceptions on climate change and provide information on which crops farmers are using for climate change adaptation and why.

Location of the survey

The survey took place in CCAFS benchmark sites of Nyando and Makueni in Kenya and the research site of Hombolo in Tanzania. This survey builds as much as possible on existing information, and therefore village and household selection for the sites Nyando and Makueni will be within the sampled group of households interviewed as part of earlier CCAFS studies undertaken by ILRI (Rufino *et al,* 2012), where in each site 200 randomly selected households were selected and interviewed. Since our study is focusing on 3 main crops (cowpea, pigeon pea and sorghum) households were selected from the initial sample of 200 who grew at least one of these target crops were selected.

In Nyando a total number of 105 households grew sorghum at the time of IMPACTLite and were selected. The other crops were not common. In Makueni, Kenya and in Hombolo, Tanzania 120 households were selected that grew at least two of the target crops. In Hombolo a sample of 112 households was derived from household lists of 12 subvillages compiled by Hombolo Agricultural Research Institute since this area is not part of the CCAFS benchmark sites.

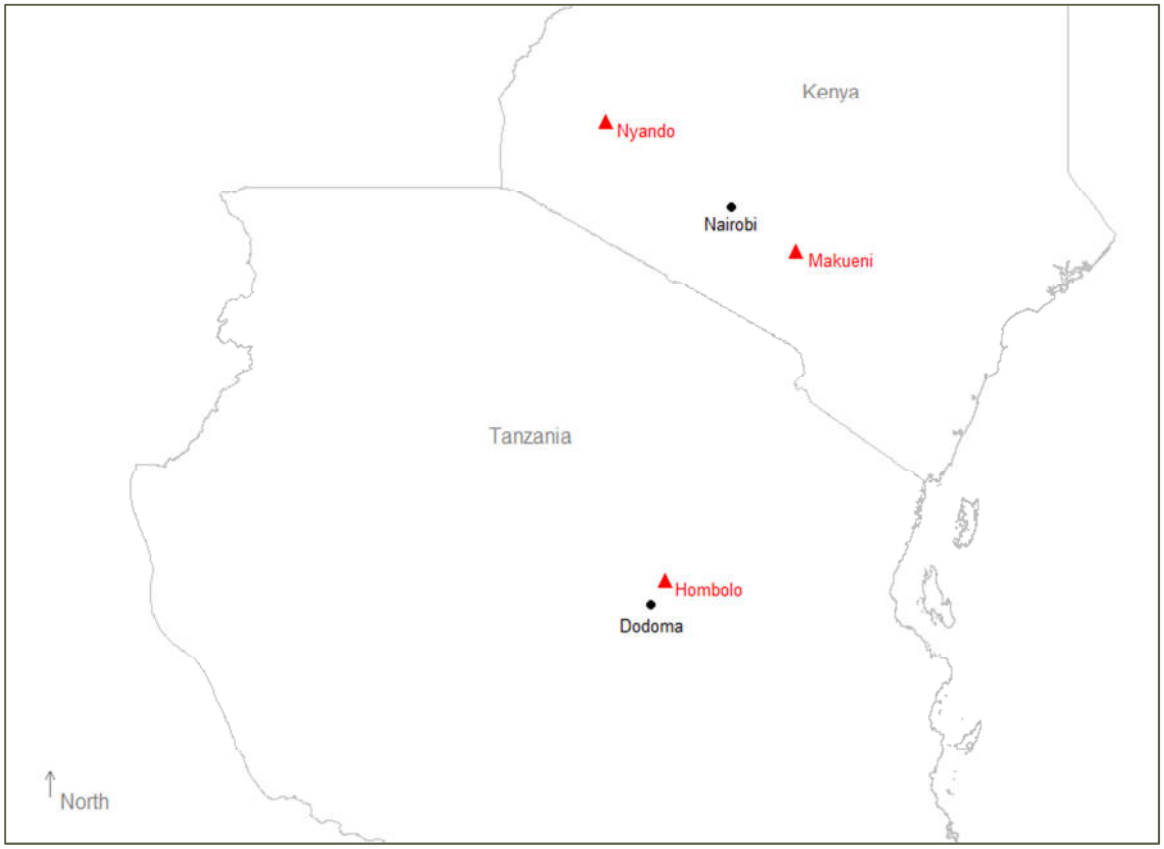


Figure 1: Research locations in Tanzania and Kenya

Design of the training

Objectives of the field team training

The training event has the following objectives:

1. To familiarize the field teams with the objectives of the survey, with the methodology and the reasons why this level of standardization is required by the household survey.
2. To provide the coordinator and enumerators with an in-depth understanding of each question in the survey questionnaire. This is more than being familiar with the questions; it implies knowing what is being asked, why it is being asked, and how it should be asked.
3. To explain the roles and responsibilities of each member of the field team, and how a chain of responsibilities has been established to help in ensuring data quality (Kristjanson *et al, 2010* for CCAFS).

Activities during the training

- Discussion of entry procedures

  This includes entry into the village and the introduction of the survey to the respondents for obtaining consent.

- Discussion of the roles and responsibilities of different members of the team
- Discussion of the key-terminologies

  For gaining in-depth knowledge and understanding of the context of the survey.

- Reading, discussing and using the questionnaire under classroom conditions.
- Pre-testing the questionnaires

  To put in practice the process of individual interviews. Experiences are shared afterwards.

- Exercises for producing farm sketches and estimating a household's time allocation
- Exercises to learn basic skills in probing

Field staff was recruited and trained in each research site. A four day training was organized which consisted of the following elements:

Day 1:

Time	Activity
	Introduction
	Working as an enumerator
	Roles and responsibilities
	Lunch
	Key-terminologies

Day 2:

Time	Activity
	Feedback and summary of day 1
	Code of conduct
	Introducing the questionnaire
	Lunch
	Explaining the questionnaire

Day 3:

Time	Activity
	Explaining the questionnaire
	Explain purpose of pre-test
	Lunch
	Pre-test the questionnaire

Day 4:

Time	Activity
	Feedback of pre-test
	Clarifications and questions
	Lunch
	Probing techniques
	Logistics of survey

Language

The questionnaires are written in English and should also be filled in English. The enumerators need to be fluent in the language used in the questionnaires so that they can translate properly into local language during the interviews. The supervisor should oversee that the simultaneous translation works well. Training of enumerators will be done using the questionnaires in English and during the training proper translations to local language will be discussed.

Roles and responsibilities

During the first day quite some time is set aside to discuss the roles and responsibilities of each team member. It is important especially when there is limited time to conduct a field survey to know who is responsible for which activity. Enumerators should be able to rely on supervisors to facilitate their work. Supervisors should be able to trust the enumerators to deliver quality data within the conditions set.

Role of the field coordinator

The field coordinator acts as a team leader in the field and will participate in the training event for enumerators before data collection starts. This person assumes the duties of a supervisor and is responsible for the smooth implementation of data collection through managing logistics on the ground, managing the enumerators in the field and troubleshooting where needed. The coordinator, together with the supervisors, needs to make sure that the questions are properly translated by the enumerators during the interview.

The field coordinator has an important role to play in adequately entering the village, introducing the survey purpose and survey team to the village leaders. This person has to engage actively throughout the data collection process to ensure that our work meets high data quality standards.

Enumerator management is critical for the successful implementation of the data collection process, as well as for data quality assurance. The field coordinator has to engage closely with enumerators and supervisors to provide support and supervision in the field as needed and manage any concerns that may arise during the data collection process. The field coordinator has to ensure that enumerators stay motivated throughout the process, countering any symptoms of enumerator fatigue appropriately.

Role of the supervisor

The supervisor is responsible for organizing and directing the fieldwork, assigning work to enumerators and ensuring data quality. Supervisors will ‘drop in’ during household visits and participate in the interviews. They will work in teams with up to four enumerators.

The supervisor needs to be equipped with a GPS unit (that is geo-referenced in the UTM coordinate system) and needs to be trained in using the GPS. They are responsible for recording the GPS coordinates for each household that is interviewed.

After the interview supervisors will collect questionnaires from the enumerators in his/her team and check each questionnaire for completeness, legitimacy and accuracy. They will brief each enumerator highlighting any concerns or unclear writing, answers that need to be clarified or gaps in data. The supervisor is responsible for the quality of the data in the database.

It is the responsibility of the supervisor to make the necessary travel arrangements for the team. In some cases, it might be necessary to arrange for other means of transportation (motorbikes).

Before leaving to the field the supervisor is responsible for collecting adequate supplies of the materials for the team.

Table 1: Field materials for field visits	
	Lists with selected households
	Enough blank questionnaires
	Supervisor control sheets
	Pencils, clipboards, sharpeners
	Envelopes or ordners to store completed questionnaires
	First aid kit (in the car)
	Gifts (e.g. bags of sugar)

Supervisor activities

While the enumerators conduct their questionnaires, the supervisor monitors the quality of work of his/her enumerators. Time will have to be put aside to check how work is progressing. All mistakes the enumerator makes should be rectified while in the village or at a later stage through the use of telephones. The supervisor will have to check every questionnaire for a given enumerator. Correction of mistakes of one village when you are in another village will be a cost for the supervisor.

Supervisor Daily Tasks

Morning
Go through the questionnaires together with the enumerators: seek clarifications, ensure that the questionnaire is complete, legitimate and accurate.
Share examples with the team but make sure that you don't put one of the enumerators down whilst doing this. We could learn from each other's mistakes.
Fill in the Supervisor control sheet and 'archive' the questionnaires.
Brief enumerators on the households they will visit
Advice on the best way to travel
Distribute field materials (questionnaires, gifts, household lists, pencils, etc.)
During the day
Visit households to collect the GPS coordinates (not the fields, but the homesteads)
'Drop in' and participate in the interviews. Make sure that the enumerator fills correctly, there is a pleasant atmosphere. Ask additional questions and demonstrate probing to enrich the data collection process and to 'teach' enumerators.
Start collecting and checking finished questionnaires
You are responsible for the well-being and safety of your team members. Carry a first aid kit
Make sure that your team has your mobile number and can contact you (even if this means charging their phones and providing them airtime). Be available at all times and ready to troubleshoot.
Arrange transport for enumerators when travelling by car. Make sure that motorbike taxis are paid at the end of the day. Instruct enumerators to negotiate a fair rate.
Keep in contact with the local officials during the day, inform them of the progress and ask them to assist in the work.
Provide replacement households (discuss with local officials and with the field coordinator) when needed.
Before leaving the site
Collect all completed questionnaires
Pay transport allowances, telephone costs, other reimbursements
Ask how the day went and write any problems or observations on the control sheet.
Inform enumerators on the arrangements for the next day (start time + location, households, etc.)
Evening
Go through the questionnaires of each team member thoroughly, highlighting any concerns or unclear writing, answers that need to clarified or gaps in data. Identify where the enumerators fall short and discuss this with them the next morning.
Fill in the supervisor control sheet. Always brief each enumerator the next morning, even if the questionnaires are done perfectly: then complement them with a job well done.

When are questionnaires complete?

Table 3: Questionnaire Checklist	
	Check whether the respondent agreed to be interviewed. If the respondent refused then the enumerator should have stopped filling the questionnaire.
	Ensures that in the first page the household ID, interview date, GPS coordinates and names of enumerators are filled in correctly.
	In the identification section make sure that handwriting is clear and the names of the household members are readable
	Check that ages are recorded properly
	Verify that the codes indication the relationship with the household head are filled correctly
	Verify that levels of education are filled in correctly. It will be difficult to remember this afterwards
	Review whether all questions have been administered and all responses have been recorded. There should be no blank questions.
	Check for complete information in C.20 on food security; no blanks in the first question on 'sources of food' (it is either off-farm or on-farm) but there can be blanks in the following question on 'shortage to feed the family'.
	Check whether question D.14 on access to seeds contains sufficient information or that there is a need to elaborate more.
	Check whether question E.2 on effects of climate change has been fully filled (no blanks) and that the 3 most significant effects are ticked.

Role of Enumerators

Enumerators are responsible for conducting the interviews within the households that were assigned to them and to follow the procedures defined in the training. If the enumerators encounter problems during data collection, they will report the problem to the supervisor in a timely manner.

Responsibilities of enumerators

- Cooperate with other team members during the training and fieldwork to ensure that the survey is carried out in a timely and professional manner
- Conduct a minimum of 2 interviews per day
- Complete all questionnaires in the field; including a thorough check of each questionnaire for completeness, legibility and accuracy before leaving the area
- Revisit households as necessary or as instructed by a supervisor
- Participate in regular review sessions with supervisors
- Advise supervisors of any problems at the moment they arise
- Reflect on the interview and keep notes of any problems, challenges or observations that could help contextualize the data
- Finished all tasks before the team leaves the village
- Deliver the completed and signed questionnaires to the supervisors at the end of each day (enumerators can't take questionnaires home to prevent loss)

Qualifications and experience

- Experience in collecting data through quantitative questionnaires
- Ability to engage farmers in open-ended semi-structured questionnaires, including listening, processing and probing for more detailed answers, as well as synthesizing and recording the information that farmers tell in detail
- Subject matter specialists with good knowledge of farming systems, agronomy or livelihood
- Fluent in English and Swahili and are able to understand and communicate in the local language (*Kipsigis or Luo in Nyando, Gogo in Hombolo and Kamba in Wote*)

Code of conduct

We agree on a code of conduct for the field team during the survey. This is done in a participatory manner during the training. The list below is the result from the different training session held in the research sites and partly adapted from a CCAFS training manual (Kristjanson *et al,* 2010).

1. Conduct yourself in a polite, sensitive and attentive manner throughout the entire time when you are present in the research areas.
2. Be polite when you approach one of the selected households, make sure you follow the locally appropriate ways of greetings and introducing yourself.
3. Keep respectful behaviour and eye contact throughout the interview and be attentive and interested in the answers the respondent provides.
4. Be sensitive to household needs and make sure you do not take up more of their time than scheduled and/or absolutely necessary.
5. Be prepared to arrange the interview at a time when it is convenient to the respondent; remember that they are offering information on a voluntary basis.
6. Engage in a conversation with your respondent, listen, probe and discuss the answers to get a full understanding of the information that is been given. Don't be afraid to ask for clarifications.
7. Be sure to use exactly the wording in the questionnaire and do not interpret the questions.
8. Avoid leading questions and listen to the responses and do not assume you know the answer.
9. In completing the questionnaire, do not leave any fields blank. Whenever a mistake is made, cross the wrong answer and write a correct answer next to it.
10. You need to pay particular attention to the instructions outlined in each question in relation to how to ask it. Follow these instructions faithfully, in particular, do not change their wording. If the respondent requires clarification or explanation you can give it but after the question has been asked in the standard form.
11. When you are probing in order to get a more detailed answer, make sure not to ask leading questions so as to avoid biasing the response.

12. Every field of the questionnaire needs to be filled. The story lines / additional information of some questions are an integral part of the questionnaire and a questionnaire is not complete without these.
13. Make sure you finalize the questionnaire at the household in case you need to ask for clarifications or follow up.
14. Treat information has highly confidential. The information which the respondent gives should not be shared with friends, neighbours or relatives.
15. The questionnaires will be collected every day and you are not allowed to take them home to prevent loss of the questionnaire and to keep information safe and secure. This to prevent someone to come into your home and read the information when the questionnaires are lying around.
16. Maintain neutrality and do not show any political, religious, social or clan-based affiliation. You are collecting data as part of research on climate change and adaptation. It is important to be clear and transparent of the purpose of our visit.
17. Read out your translated version of the confidentiality statement at the beginning of the interview and ask for the respondents consent.

Introduction and consent by main respondent

Before the beginning of the interview read out the following paragraph and ensure that the respondent understands before asking for consent.

Greetings/salutation: My name is .... and I am working for .... On behalf of ABCIC (African Biodiversity Conservation and Innovation Centre) with permission from the local government we are conducting a survey on farming practices, focusing on Sorghum, Cowpea and Pigeon pea and we want to asses the levels of diversity on your farm. We would like to ask you some questions that should take no more than three hours of your time. We would like to share some of this information widely in order that more people understand how you use ***cultural knowledge and traditional farming practices to recover, mitigate and manage agricultural risks and weather related calamities.***

Your name will not appear in any data that is made publicly available. The information you provide will be used purely for research purposes; your answers will not affect any benefits or subsidies you may receive now or in the future. Do you consent to be part of this study? You may withdraw from the study at any time and if there are questions that you would prefer not to answer then we respect your right not to answer them.

Example of a confidentiality statement (Tanzania)

Key-terminologies

A list of key-terminologies is discussed during the training to ensure that all enumerators have a common understanding of the important issues in the survey. The full list of key-technical terms and their local definitions can be found in annex 2. This list will be compiled during the enumerator training and all the participants are asked to think about a suitable way of describing the concepts in the local language. It is important to understand all the concepts and terms listed, and to have a uniform understanding of their meaning as a team in order to ensure that questions are posed in similar manner.

Definition of "Household"

For this survey a household is defined as the total number of family members who share the same kitchen. It includes visitors who stay more than 1 month, and excludes those family members who stay outside for more than 1 month period.

Definition of Agrobiodiversity (agricultural biodiversity)

Agrobiodiversity are all of the components of biological diversity relevant to food and agriculture, including agricultural ecosystems. It therefore includes the variety and variability of animals, plants and micro-organisms at the genetic, species and ecosystem levels that are necessary to sustain agricultural production (CBD, 2014).

English	Swahili	Kipsigy	Luo
Agrobiodiversity	Kilimo cha aina tofauti ya mimea ya wanyama	Temisietab tuguk che terter	Pith/pur makgik mopogore

Definition of Climate change

Any change in climate over time, whether due to natural variability or as a result of human activity (IPCC).

English	Swahili	Kipsigy	Luo
Climate change	Mabadiliko ya hali ya anga	Waletab koristo	Lokruok mar kor iwasi

The Framework Convention on Climate Change (UNFCCC) defines climate change as a change of climate attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods.

Definitions of adaptation, resilience and vulnerability

Adaptive capacity is defined as:
The ability of a system to adjust to climate change (including climate variability and extremes) to moderate potential damages, to take advantage of opportunities, or to cope with the consequences (IPCC, 2001b)

Individuals, households or communities varying access and control over natural, human, social, physical, and financial resources determines their adaptive capacity. For example their knowledge of climate risks, good health, community involvement, access to utilities such as irrigation and productive land, access to seeds, varieties and access to other income sources (adapted from Davé et al, 2009).

Adaptation: Actions taken to help communities and ecosystems cope with changing climate conditions, such as the construction of flood walls to protect property from stronger storms and heavier precipitation, or the planting of agricultural crops and trees more suited to warmer temperatures and drier soil conditions (website of the UNFCCC 2014).

Resilience: Resilience refers to three conditions that enable social or ecological systems to bounce back after a shock. The conditions are: ability to self-organize, ability to buffer disturbance and capacity for learning and adapting (IPCC, 2001a).

A resilient community is capable of minimizing the effects of or recover quickly from any negative impacts (including calamities) and return to a similar or better situation than before the impact took place. There is a strong linkage between resilience and adaptive capacity and for this reason resilience will not be the same for different groups within the community (adapted from Davé, 2009).

Calamities
A calamity is an event causing great and often sudden damage or distress; a disaster (2014 Merriam-Webster). For the purpose of this research we can also refer to the definition of a *hazard*.

***Hazard**: 'A dangerous phenomenon, substance, human activity or condition that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage'.*

When we discuss hazards or calamities, we are referring both to shocks, such as droughts or floods (rapid onset), and to stresses, such as changing rainfall patterns (slow onset).

Source: Dazé, 2009 > "Climate Vulnerability and Capacity Analysis Handbook"

Vulnerability: the extent to which a natural system or human society is unable to cope with the negative impacts of climate change, variability and extremes. It depends on changes in climate as well as the sensitivity and adaptive capacity of the system or society (IPCC, 2001a).

Vulnerability to climate change has been defined as:
The degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude, and rate of climate variation to which a system is exposed, its sensitivity, and its adaptive capacity (IPCC, 2001b).

Following the definition of CARE (2009):

In the context of the CVCA, the systems we are referring to are communities (recognizing that communities are not homogeneous, so particular households or individuals within communities may have differing degrees of vulnerability).

Exposure to climate variation is primarily a function of geography. For example, coastal communities will have higher exposure to sea level rise and cyclones, while communities in semi-arid areas may be most exposed to drought.

Sensitivity is the degree to which the community is affected by climatic stresses. A community dependent on rain-fed agriculture is much more sensitive than one where the main livelihood strategy is labour in a mining facility, for instance.

Source: Dazé, 2009 > "Climate Vulnerability and Capacity Analysis Handbook"

Exercise: Climate Change brainstorming

Hand out coloured cards and markers to the participants. Ask the participants to write down anything they associate with climate change. Give them enough time to write down their answers.

Prepare a large paper sheet and write down Climate change in the middle.

When you receive back the cards ask them to stand up and read their cards before you tape them to the sheet (not in order but as soon as a person finishes his/her card). Structure it so that each corner of the sheet becomes a definition, a cause, an effect, a form of adaptation or mitigation.

Start with the definitions: which one do they think fits best, can we make a common one based on the definitions given here?

Then move to causes and effects or impacts. Summarize these as there will likely be overlap between the different cards. End with the forms of mitigation and adaptation. Explain the difference between the two concepts and explain that adaptation is central to our research (why we are interested in learning how farmers adapt their practices and what type of information we are looking for).

Alternative: use flipcharts and make a mind map with the group (not stopping at the first level but also elaborating on the ideas they put in and branching off).

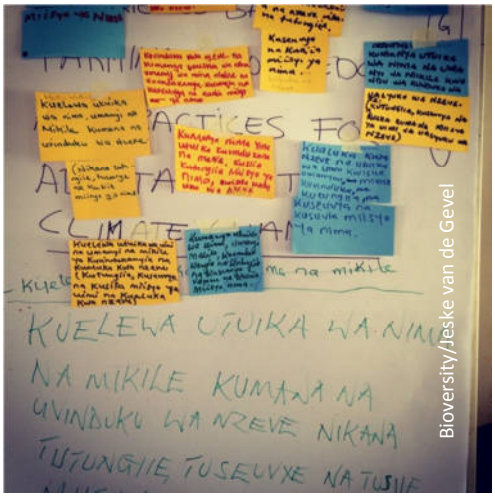


Fig 2: Exercise translating key concepts

Exercise

Using coloured cards ask the participants to write down the translations of key-concepts into their local languages (for example the objective of our study from the list of key-terminologies). After a few minutes ask one of the participants to write down the answers of the other participants on a flipchart. Note down the English name first and below a list of the given answers. Let them discuss which translation gives the best explanation.

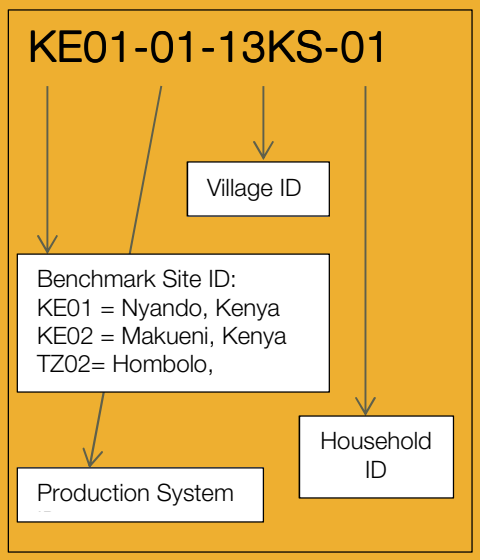
Using these key-concepts let them construct the best translation of our objective in their local language. Let them discuss and compile a common definition from all their answers.

Getting started

Enumerators need to plan their movements properly in terms of where they start and finish avoiding wasting time moving up and down the village (Kristjanson *et al, 2010* for CCAFS).

There are a few steps that an enumerator has to go through before beginning the actual interview process:

Explain the different parts that make up the household's unique ID.



Explain that this is a unique ID which has been assigned to each household in previous studies. A list of the selected households will be provided to each enumerator upon the start of the actual survey and a list of household IDs and names of respondents will be shared with the enumerators before they start their work in the morning.

Step 1:

The household ID will be produced by the survey team. This is a very important first activity. Always make sure that enumerators work with the right sample

Step 2:

Identify an appropriate respondent for the interview. Ideally we interview the household head or spouse. If nobody is around to answer questions enumerators move to the next household and plan to revisit the household after this interview is finished. If you are unable to find a respondent, you will inform the supervisor and ask for a replacement household.

Step 3:

At the start of the interview enumerators introduce themselves; explain the purpose of the interview, how it works and how long it will take. On the cover page of the questionnaire there is a confidentiality statement which you are required to read to the respondent before the start of the interview. Enumerators should 'own' the statement in order for the respondent to be confident in them. You should not just read it out loud.

Step 4:

Enumerators introduce themselves as a member of the organization that they work for (e.g. university, consulting firm).

Step 5:

Enumerators repeat the confidentiality statement if another household member joins the process.

Step 6:

Be honest that this interview will take about 2-3 hours of the household time.

Step 7:

This interview targets the household head. In his/her absence the spouse or any other responsible adult in the household should be used to handle the interviews. Record if the main respondent is giving consent for the interview.

Step 8:

Ensure that the respondent understands that names will not appear in the information we publish. We will use the information they provide but we will make sure that names of the household will not be published.

The questionnaire

Before starting to go through the questionnaire page by page let the participants browse through it and ask for their initial thoughts on feasibility of the study. Explain the timeframe for conducting interviews (2-3 hours) and go through the different sections.

Emphasize the importance of the confidentiality statement and how to avoid privacy issues (e.g. not taking the questionnaires home, not leaving them lying around in the office, being a 'neutral' interviewer). Explain that without the respondents' consent the questionnaire becomes worthless and we cannot use any of the data collected.

0 Cover page

Before the beginning of the interview read the confidentiality statement and ask for permission to conduct the interview. When the respondent gives consent note this at the left bottom of the page. Fill the following fields:

Name	Description
Interview date + time	Note down the date in day/month/year format and the exact time of starting the interview.
Household ID	The ID number of the household is provided to you by your supervisor. Make sure you note down the correct number.
Country/village	Note down the country code and the name of the village (KE01 in Nyando, KE02 in Wote or TZ02 in Hombolo).
Enumerator name	The person conducting the interview writes down his/her name.
Geographical location (location, village and GPS coordinates)	This is the geographical location of the household. The GPS coordinates (Q.5) will be provided by the site coordinator.
Supervisor name	The person supervising the enumerator and the date when the filled questionnaire was collected. The supervisor will fill both fields.
Data entry information (name and date)	This is filled by the data entry clerks after the survey is checked and approved by the supervisor and site coordinator. Do not fill this field.

A Identification

On the second page of the questionnaire demographic data is collected to allow us to characterize the households we have interviewed. Fill the fields described below:

Name	Description
Total household number (top right corner)	Indicate the total number of household or family members. Also include family members who have not finished education.
Main respondent	Indicate the main respondent with * and the co-respondent with **. If a person was not present during the interview leave it blank. The main respondent should be the person who is responding to the questionnaire. This person should be the household head or a person within the household who makes most household/agricultural decisions. In some cases there is a second respondent answering sections of questionnaire. For example, the wife of the farmer may answer household consumption questions. Record it here if applicable.
Family members	Indicate the full three names of family members who finished any form of education. This distinction is made to collect information on the number of dependants within the household. A dependant is a person who is not part of the working age population.
Age	Write down the age of the family member. We are asking about age, so please be specific. This is not a question about respect, so certain concepts (e.g. *mzee* in EA) are not appropriate. People may not know their age, in that case please use your own judgment (if the people are present) or use some important local event that is roughly 60 years ago (e.g. independence, a major drought, death of important person, etc.).
Sex (F/M)	The gender of the household member.
Relation with the household head (HHH)	This refers to the position of the member within the household. The household head, wife, son, daughter, sister, house worker, etc.
Education level	The highest level of education completed by the household member. Use codes listed in the textbox on the right and specify between no formal education, only (some) primary education, secondary education, post-secondary formal education and Adult education.
Mobile contact	Note down the mobile phone number of the family member.

B Socio-economic and animal asset information

This section addresses questions about the main sources of on-farm and off-farm income. Make sure that distinction between the different categories is clearly made when asking the questions.

1. Main sources of income

This question asks about the sources of income a household may have access to. Allow them to explain what their main sources of income are. Do not go through the list row by row but give examples from the list to probe and capture a more complete answer. Place a tick in front of each source of income which the respondent mentions. Afterwards ask the respondents to rank the different sources of income in order of most important (largest proportion of the total income). When mentioned specify which animal products are sold and used as a source of income.

2. Animal Assets

Indicate here the different livestock species (including poultry) that are fed and taken care of by the household. Indicate the number of animals in each category for each livestock species. Include their young.

3. Membership, association or access to services

Indicate whether any family members have been or are involved in any of the mechanisms listed. We want to know their involvement in any of the mechanisms for the past 12 months. Go through the list row by row and place a tick when the respondent indicates their involvement. Use the comment section of this question to further specify their level of involvement, in which kind of organization (purpose, name, size) and what benefits its offers for the household in terms of coping with challenges.

C Landscape and crop diversity management

This section deals with farm characterization: how much land does a household own or rent? And what crops does the farm produce? How do household members manage their time?

0. Farm Sketch

One of the tools in the interview and an important means of recording information is a sketch map of the household's farm. An example of an agricultural census map from Swaziland is shown on the following page (Bruce, J.W, 1989). This map requires a walk around the farm, possibly going up onto a hill from which you can see several areas in which the household has fields. This map is indispensable when working with households which have more than two or three plots in their farm.

When the fields are located at a distance of the house use probing techniques to indicate the (sub)plots and specify which crops are grown (this season or last season) or trees and/or pastures. Also indicate the position of land marks, houses, home gardens, tree lots, wells, access roads, streams, terraces and slope when applicable.

Also note down the size of each subplot and indicate whether this is intercropped (probe on percentages).

The farm sketch will make it easier for you to go through the rest of the questions and check whether information is complete or accurate.

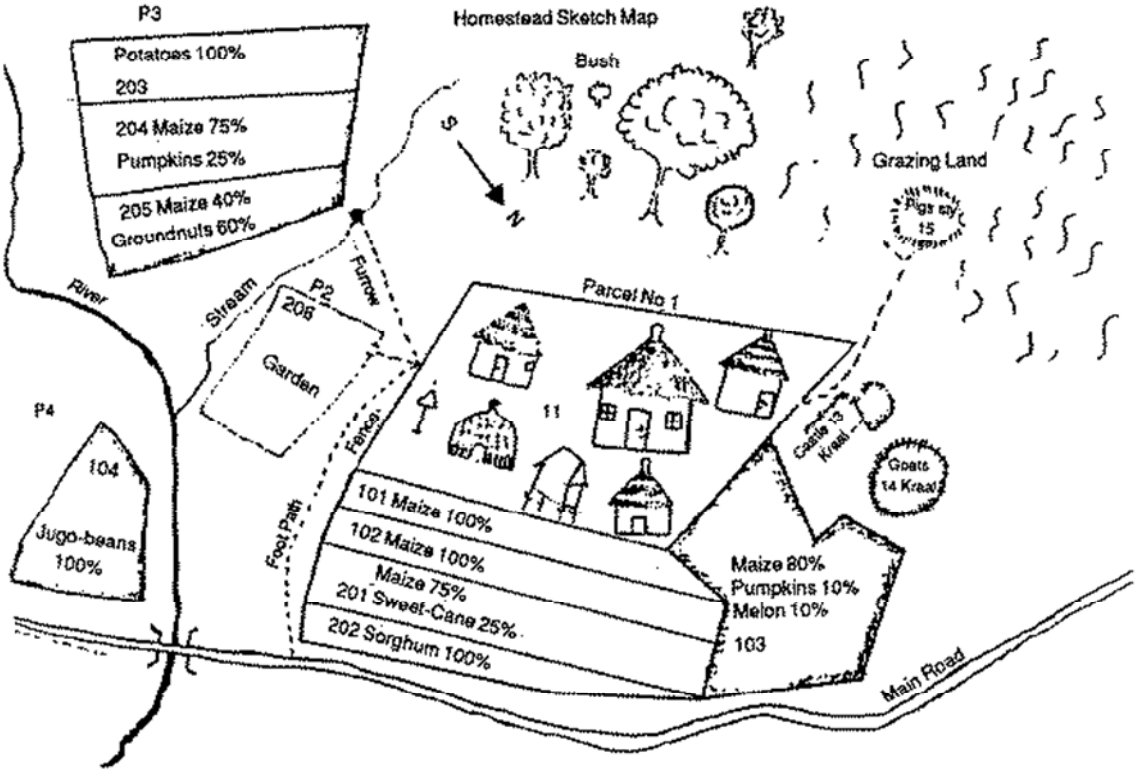


Fig 3: example of a farm sketch (FAO, 1989)

Exercise 'Farm Sketch'

Break up in smaller groups of 3-4 participants. Hand out large sheets of papers, markers and pencils. If there are enough trainers assign one to each group. The trainers will be the respondents and the group can ask questions to collect information for drawing the farm sketch. Agree with the other trainers before on the number of plots but leave the rest open to their imagination.

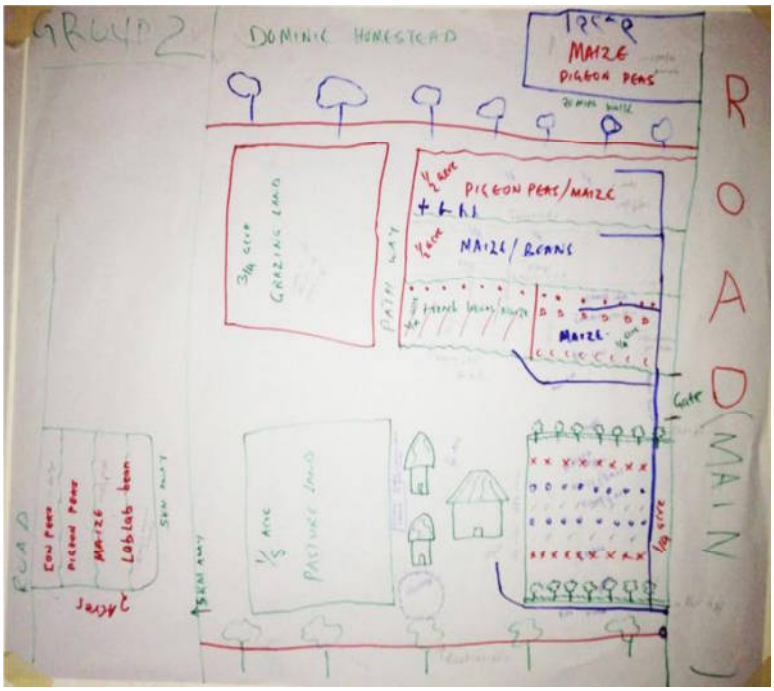
Another way is to give the main outline of the farm before the exercise and go round to each group to answer more detailed questions (in case there are not enough 'respondents').

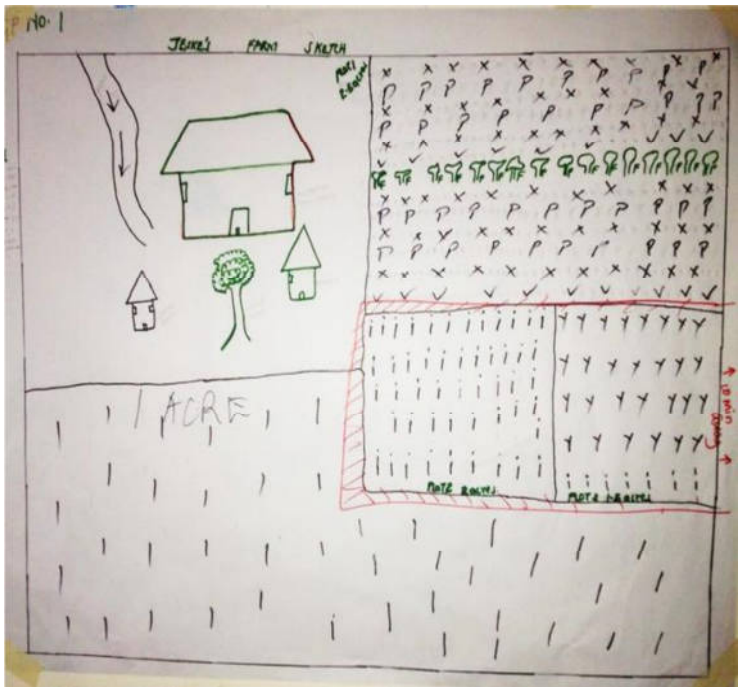
After 20-30 minutes ask one member of each group to present their farm sketch. Make sure that the participants understand the difference between plots and subplots. Explain the level of detail needed for the farm sketch. Point out that the more in-depth/follow up questions you ask the more accurate the sketch becomes.

Example: *one of the groups we trained did not ask how many plots were owned and drew one large plot instead of 3 separate plots. They also decided upon the size of each subplot and placement of trees and crops without consulting the respondent.*

Leading questions were asked when estimating the size of the plot: "so the part where your house is located is 0.25 acres?". A respondent might choose to agree even if it isn't true to avoid discussion or loss of time.

Fig 4: examples of farm sketches during a training session





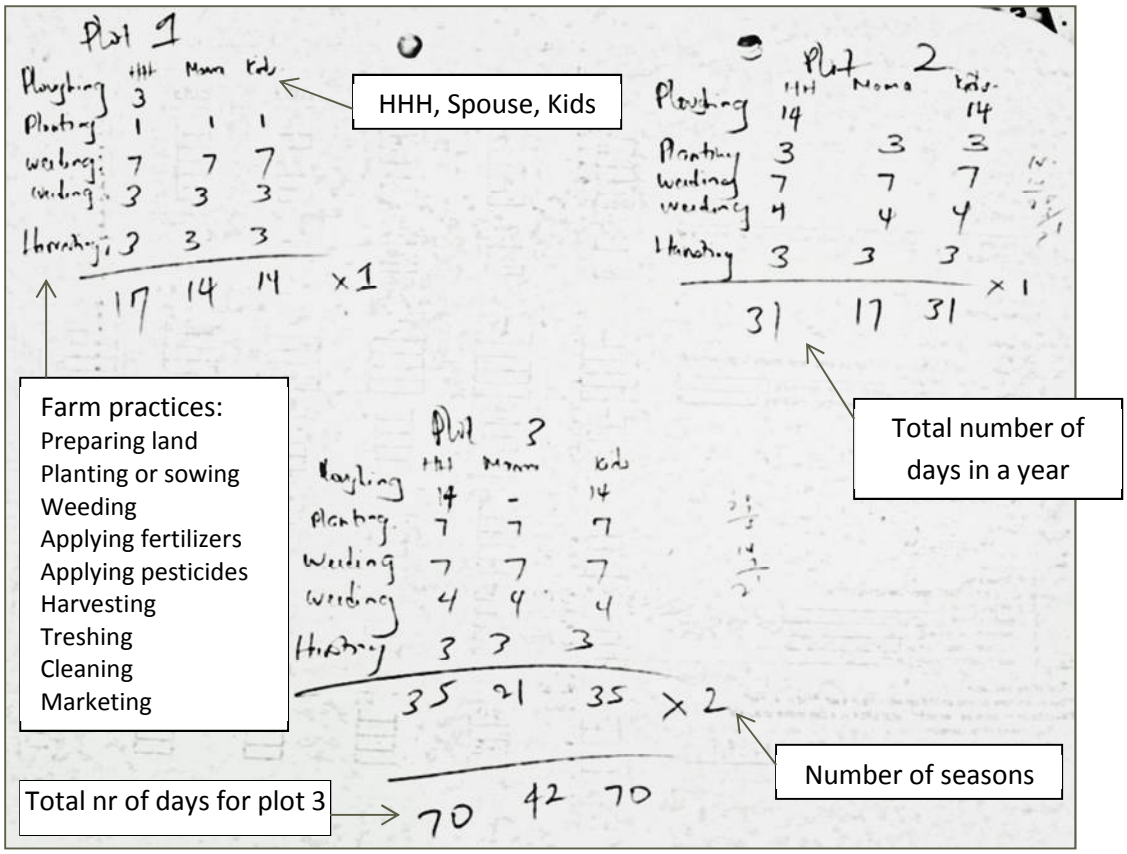
1. Land allocation

Fill the fields as described below:

Q	Name	Description
2	How many plots	How many farming plots (farming fields and plots) does the household currently have access to? Note down the number of plots.
3	Main use of plot	For each plot note down the main use in the cropping season. If there are other uses than those listed here, specify for what purpose the plot is used.
4	Percentage cultivated	For each crop plot specify the percentage of the plot that you cultivate. Is it the complete plot (100%) or only part of the plot (for example 30%)?
5	Type of crop plot	Specify further for each plot that contains crops whether it is used for growing specific crops (or combination of crops) or if the plot is used as a kitchen garden (home garden) or both.
6	Ownership of land	Fill in the correct code for each plot. For borrowed plots specify from which source (borrowed refers to plots not rented in direct exchange for money) and for rented plots indicate cost/return per cropping season for each plot.
7	Location of the plot	Indicate the smallest administrative unit in which each plot is located (e.g. village, sub-location, division, county, etc).
8	Type of land	Indicate where the plot is located in terms of physical features in the landscape (on a slope, a hill, near a river bed). Write down the appropriate code for each plot.
9	Distance of the plot to the household	Indicate the mode of transport of getting from the household to the plot and the approximate time to get there. W*hen the plot is located 30 min away from the household and the family member uses a motorbike then fill in code 3 first followed by 00:30. When the plot is located next to the house you would fill in code 1 and 00:00 since there is no travel time involved.*

10	Size of the plot	Note down the size of each plot in acres. You are not expected to measure each plot, but try to verify whether the acreage that is mentioned seems correct (either by seeing the plot or probing for total land size and specifying further for each plot. This is best done during the time you draw the farm sketch).
11	Time allocation (figure 2)	Specify the number or working days which are spent in each plot in a year. The total effort one person can make is 365 days. This includes family members but also hired in labour. Please indicate the position of the person under person A or B. It is possible to group hired labour together under one person. Use the blank page (backside of page 4) for your calculations. See example below.
12	Land assets	Indicate which assets are currently present within the household. Copy the assets already indicated in the farm sketch and probe or observe other assets for each plot.
13	Land preparation and management methods	For each plot indicate which methods are used to manage the land. For example how does the household plough? How do they plant? Which inputs does the household use? Go through the list and note down the correct code for each plot.

Fig 5: example of a time allocation calculation* (from the household survey in Nyando)



14. List of crops grown this season

For question 14 of Section C first, tick the box to indicate in which growing season this survey takes place. Is this the season for the long rainy season or the short rainy season? Or refer to the season that has just ended. Secondly, indicate the duration of the season in months.

For each plot write down the name of the crops that are grown and specify the names of the varieties for each crop. Use local names and if you are unfamiliar with the variety try to get a description. Indicate the area in which each variety is grown. See figure 3.

Fig 6: example of crops and varieties (from the household survey in Nyando)

14	Fill out the below table only for crop plots		
Plot	CROPS GROWN THIS SEASON Months: from [**March**] to [**August**] Tick: √ Long rain season O Short rain season	Variety name	Area: Size of subplot (acres)
1	**Sorghum**	**Kajimbo nat.**	**3**
	Sorghum	**Kajimbo nat.**	
	Sorghum	**Serredo**	**2.5**
	Beans	**Beso riadore**	**intercrop**
	Maize	**Nyamula**	**2.5**
	Groundnuts	**Njugu (big grain with light red colour)**	**intercrop**

15. List of crops grown previous season

See description of question 14 on how to fill this table.

16. List of other crops grown

See description of question 14 on how to fill this table. For this question list the crops that are grown out of season and/or perennial crops which are taken care of within the farm.

17. Historical use of the plot

Indicate the main use for each plot 10 years ago. Only include the plots that were owned, borrowed or rented 10 years ago. Do not include plots that were outside of the farm 10 years ago even if the respondent might know what they were used for.

18. New crops

Discuss with the respondent if they have started growing crops that were newly introduced in the community in the last 5-10 years. If so, list down their names.

19. Reasons for introduction and distribution of new crops

Discuss with the respondent what they indicate as the reasons for adopting the new crops. For example the newly introduced crop is faster maturing or has a higher yield.

20. Food security within the household

Ask the respondents to describe a typical food year: for each month say whether the food is mainly from their own farm or from sources outside the farm. Examples are purchased goods or food aid. Please make sure that each month is filled with either code 1 or 2.

For the second part of the question indicate the months in which the household tends to find they do not have enough food to feed the family/there is a shortage. Leave the rest of the months blank.

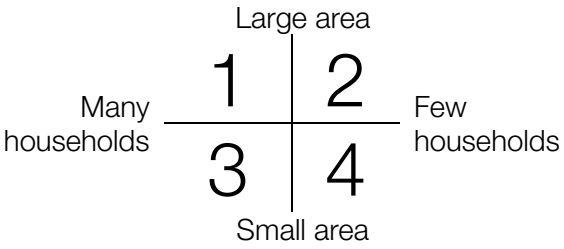
D Focus crops: sorghum, cow pea and pigeon pea

This part of the questionnaire focuses on 3 main crops although we are also interested in other crops and activities that affect the whole farm (see part B and C). Only answer the question in case the farmer actually grows the crop. For some that will be only one, for others all three.

	Name	Description
1	Target crop varieties	How many varieties does the household have (both in the field and in storage). Indicate their local names. When unfamiliar with the variety write down a short description. List all sorghum, cowpea and pigeon pea varieties.
2	Variety seed source	Indicate the source of the variety listed in the table.
3	Preferred source of seeds	Indicate the preferred or what is perceived as the best (most reliable) source of seeds for each variety mentioned or preferred.
4	Variety type	Indicate for each variety whether it is a hybrid, traditional or local variety. 'Acquired from outside' refers to seeds that are not hybrid but are landraces that do not originally come from this community.
5	Cultivation of the variety	Indicate (probe, try to find out) for each variety if it's cultivated in a large area or small area within the community and whether it is grown by many households or only a few. Indicate the code for each variety. See fig.4.
6	Cultivation of the variety 5-10 years ago	Indicate (probe, try to find out) for each variety if it was cultivated in a large area or small area within the community and whether it is grown by many households or only a few. Indicate the code for each variety. See fig.4. When there is a variety that was not available within the community 5-10 years ago we use code 5.
7	Saving seeds	Indicate for each variety if the household stores and re-uses seeds in a next season. Write down Y for yes and N for no. If the household does not save any seeds you can skip questions 8 and 9.

8	Obtaining new seeds	Indicate how often the seedlot is renewed or changed. Does the household obtain new seeds of the same variety from outside the farm? If so, how often? Select the corresponding code.
9	Seeds in storage	Tick the varieties of which the household currently stores seeds.
10	Satisfaction with variety	Does the respondent still see themselves grow the variety 5 years from now?

Fig 7: Four-cell analysis (Sthapit, 2005)



1. *Varieties grown in a large area by many households.*
2. *Varieties grown in a large area by few households.*
3. *Varieties grown in a small area by many households.*
4. *Varieties grown in a small area by few households.*

With this technique, we can classify all the varieties grown in a 2x2 matrix, allocating each to one of the four cells: many HHs, large area; many HHs, small area; few HHs, large area; and few HHs, small area. After the deployment of varieties in different cells, in subsequent steps we analyzed the characteristics of varieties that fall within and between different cells. In focus group discussion, we can ask a simple question, "Why is variety A grown in large areas by many HHs in the village and why is variety B grown in small areas by many HHs?", and record the reasons. This tool encourages farmers to bring out common factors for choosing and allocating plots to a certain variety. We also explored different value-addition options amenable to different landraces to make them more competitive. Finally, the four-cell analysis model helped community as well as researchers and development professionals to understand the threat of genetic erosion, and current knowledge is used to suggest conservation actions on landraces, specifically whether to conserve them on-farm or *ex situ* in genebanks.

11. Preferred traits and performance

Ask the respondent to give the names of the 3 main varieties of sorghum, cowpea and pigeon pea they use. List the best and worst (least attractive) traits of the varieties. Do not go through the list row by row, instead let the respondent talk freely and tick the traits during the conversation or immediately after.

Make sure you understand each of the traits in the list before you ask this question. Without a thorough understanding you will not be able to tick the right boxes.

12. Selling harvest

For the crops currently grown indicate if the household plans to sell (part of) the harvest. If so, also indicate to whom they are planning to sell. Are these other home consumers (relatives, neighbours), brewers, manufacturers, traders or others?

13. Local price per unit

Indicate the average local price per unit in the market (indicate unit and price in local currency).

14. Access to seeds

Discuss with the respondent any challenges the household is facing in gaining access to seeds of certain varieties. Write down main concerns, preferred sources, limited availability and quality issues for each of the target crops. Take time to answer this question and be specific (not crop failure, but *how* does crop failure lead to a restrained access to seeds).

15. Land use changes

For this question we want to know whether the household has made any changes in the management of their land, their soil or their water resources within a time period of 5-10 years*. Go through the list row by row and tick each management strategy the respondent refers to. For all the changes that the respondent mentions write down the main reason(s) for making these changes (what are the advantages, what are they trying to adapt to, what has changed from the situation before?).

* *If the respondent is too young to have been farming 10 years ago, ask whether their father has farmed at this location and what he did 10 years ago. If the respondent has been in the area over the past 10 years, but has different plots, include his responses. If a respondent is unable to recall what happened in the last 10 years, you may make reference to major events ten years ago, e.g. the millennium celebrations.*

E Perceptions on Climate Change and adaptation strategies

There are many belief statements about changing climates and the susceptibility of crops to these changes. The questionnaire contains a list of statements. We want to find out whether the respondent agrees with the statements or not.

1. Statements on changing climate

For these statements explain that the timeframe is 10 years and we are trying to see whether the respondent notices any changes in the climate. For example: *Modern varieties become more susceptible to pest and diseases if you grow them year after year.*

Respondents have to choose one of the following:

- Strongly agree
- Slightly agree
- Undecided
- Slightly disagree
- Strongly disagree

Make sure each row is filled with at least one of the options. Tick the right box.

2. Effects of climate change

Ask respondents which biotic and abiotic effects can be attributed to climate change. Go through each row and ask if there is an increase or a decrease in the effect listed. If the respondent has not witnessed any changes in that particular effect you indicate this in the column '*not different'*.

If respondents have indicated that they noticed changes in a certain biotic or abiotic effect, ask how the respondent will react to this change (probe on land use and management changes, but don't leave out other adaptation strategies the respondent might suggest).

To conclude ask the respondent to give the 3 most significant effects (what they perceive as having the most impact on their livelihoods). Allow the respondent time to come up with the 3 effects themselves, before going through the list. Be careful to not lead respondents to name certain effects.

	Name	Description
3	Major calamities	Indicate what the major calamities in the community are by ticking the corresponding circles for each of the calamities that the respondent mentions. After this rank the ticked criteria in order of importance. For crop diseases and pests please specify which pest or disease the respondent refers to.
4	Satellite fields (plots located further away from the house)	Indicate to what extend the respondent agrees with the statement. Use strongly agree, slightly agree, neutral, slightly disagree, strongly disagree or don't know.
5	Food types	Indicate to what extend the respondent agrees with the statement. Use strongly agree, slightly agree, neutral, slightly disagree, strongly disagree or don't know. If the respondent agrees or strongly agrees tick the calamities that are applicable and write down the names of the crop varieties which have a tendency to survive better. Do the same for the crop varieties which are failing seriously. For crop diseases and pests please specify which pest or disease the respondent refers to.
6	Changing farming practices	Indicate to what extend the respondent agrees with the statement. Use strongly agree, slightly agree, neutral, slightly disagree, strongly disagree or don't know. If the respondent agrees or strongly agrees tick the

		calamities that require a change in practices and write down the practices (e.g. HOW) that the respondent uses to adapt to the calamities. Pick answers from the list on the left. For crop diseases and pests please specify which pest or disease the respondent refers to.
7	Famine foods as an adaptation strategy	Indicate to what extend the respondent agrees with the statement. Use strongly agree, slightly agree, neutral, slightly disagree, strongly disagree or don't know. Give the local names of the naturally growing foods that the respondent knows to be used within the community. Think about wild fruits, vegetables, forest products.
8	Impact of calamities on the environment	Indicate what the major calamities in the community are that have an effect/impact on the environment by ticking the corresponding circles for each of the calamities that the respondent mentions. Write down how each calamity has an impact on the environment.
9	Weather information	Indicate to what extend the respondent agrees with the statement. Use strongly agree, slightly agree, neutral, slightly disagree, strongly disagree or don't know. If the respondent agrees or strongly agrees tick the types of weather information that is received by members of the household regularly over the last 2 years. Rank the 3 most important sources of weather information the household receives. Indicate the source of each of the types of weather information which is ticked. Write down the code of each information source and choose from the list below the question.

11. Adaptation strategies

This is a more open-ended question in which we try to find out what plans the respondent or other members of the households have to adapt to the effects of climate change. Relate this question back to all the challenges that were discussed during the interview. You can use it to summarize the key-issues raised by the respondents and check if there is something to add or whether they agree.

12. Support needed

Discuss with the respondent what type of support the household or farmers within the community would need to enhance their knowledge and experience in farming. What would they like to do but cannot do themselves?

For this question it is important not to raise the expectations of the respondents. They might assume that you are there to bring them support in terms of inputs or money. Be explicit in the fact that we are conducting research and are not in a position to bring any goods or services. The respondent should understand that he or she is volunteering their time.

Avoid directing the respondent to certain answers by explaining in too much detail or by assuming they will answer the same as other respondents. Take time for a discussion, do not rush through.

F Final note/ remarks

Given the respondent the opportunity to give feedback (*Are there any issues or topics we have not covered but you would like to add?),* and thereafter thank the respondent for the information and time.

After the interview the enumerators take time to note down anything of importance to the analyzing team, such as:

- If the respondent was in a hurry or distracted in any way.
- Note down if the first respondent was replaced or accompanied by another respondent – indicate by whom and for which questions.
- Indicate if you feel the respondent was sincere, and if they were really interested to providing good information.
- Anything that went different from planned in this particular interview.

Probing and active listening

In our questionnaires we are trying to get an in-depth response to our questions. We are asking for more information than a simple 'yes' or 'no' and will need to ask follow-up questions when an answer is not clear, or probe to try to get more detailed responses. Probing also allows for a conversation in which we gain understanding of someone's opinion or perception. You cannot reach this level of understanding by simply asking the questions that are in front of you. On the next page you will find a table with different probing techniques. Try to go through this list and think of some examples.

Probing exercise

Go through the list of probing techniques (table 1 on following page) with the enumerators during the training and explain them one by one. Give relevant examples for each technique and check whether the participants understand and can give examples themselves.

If there is sufficient time let them role-play with their neighbor one of the open-ended questions in the questionnaire whilst practicing the different probing techniques. Afterwards ask each duo to come up with a list of probing techniques that they have used and if they felt the technique was applied properly.

Active listening

In order to build rapport and trust and understand what the respondent is telling you it is important to work on our listening skills. The respondent is volunteering their time to us so we should give them our full attention. We are there to learn from them. We should:

Source: London Deanary, 2013

Fig 8: Active listening

Probing techniques

Probing Techniques	Methods	Examples
Active silence	Active silence	"…"
Minimal probes	Humming	"mm-hm"
	Echoing	repeating one or a few words from the respondent
	Comment (negative/positive)	"oh yeah?", "interesting", "really?"
Unfinished question	Unfinished question/sentence	“but, what exactly…” or “so you mean…”.
Question Repetition or Reformulation	Question Repetition	Repeating the same question again (with different intonation)
	Question Reformulation	Finding a new way to ask the same question (to clarify, to get a another answer)
Request for Elaboration	Request for Elaboration	Asking for more information
	a. Directive	“tell me more”, "Is there a different way to say the same thing?"
	b. Non-directive	“earlier you said… could you tell me more”, "Which of those things makes the biggest impact?"
Request for Specification	Request for Specification	Asking on what to respond to exactely
	Request for Specification by Example	"can you give an example of that", or "Can you give an example of where that happens?"
	Request for Specification by Constrast	"what is the difference between… and …" "if you had to choose which one would you pick", or "So what happens if we made it *bigger* or *smaller?", or* "What would be the opposite of that?"
	Request for Specification of own Opinion	specify if an opinion previously presented is the respondents own opinion, and if not what their own opinion is. For example "Can you explain how you worked that out?"
	a. Directive	"what would be your opinion on this"
	b. Non-directive	"earlier this was said, what do you think?"
Follow-up question	Follow-up question	Introducing a new sub-topic
	Request for Reasoning	"why?", "That’s true, but why do you think that is?", "What is the evidence that supports that suggestion?"
	Request for Experiences	"Is that always true or just in this example?", "Is it true for everyone or just some people?"
	Request for Feelings	"How did you know that? What made you think of that?"
	a. Directive	"How do you feel about this"
	b. Non-directive	"When this happened how did it make you feel"
Expressions	Expression of Doubt	"Is that true"
	Expression of (Lack of) Comprehension	"So if I understand correctly…" or "I'm not sure I understand what you are saying"
	Expression of Perceived Inconsistency	"But what’s the reason for that? And how is that connected to the first part?"
Paraphrasing or Summarizing	Paraphrasing	putting some of the things the respondent said into your own words
	Summarizing	putting the main ideas of the respondent into a shorter version
Reflection	Reflection	The interpretation of the response, the possible relation to earlier responses (in the sense of consequences, similarities or inconsistencies) and the formulation of this interpretation and this possible relation.

Leading questions

Never "lead" a respondent to a particular answer. This can be difficult since it is natural to do so in ordinary conversation. Consider this "leading" probe:

Interviewer: "In the last 12 months, how many times did you apply pesticides to your crops? Would you say:"

A. None
B. Once
C. Twice
D. 3 times
E. 4 times
F. 5 to 9 times
G. 10 times or more

Respondent: "Oh, gosh, I don't do this very often... in last year, just a few times."

Interviewer: "So, would you say twice, or three times?"

Respondent: (Thinking to herself, "that must mean that 'a few' means only two or three times a year. I know I've gone more than four times, but I said I didn't go that often, and I don't want to sound stupid.") "I guess I'd say three times."

Rather than suggesting an actual number or numbers, the proper probe would be a neutral probe like the ones suggested above: "What's your best guess?" or "Which would you pick?"

Other leading probes to avoid are "Do you mean _____?" or "Then you feel ____?" Some people tend to say "yes" to any suggestion either because it's easy or because they think it's the "right" answer.

CDC, 2014 (adopted from the CDC interviewer training http://www.cdc.gov/brfss/training/interviewer/04_section/13_probing.htm)

Pre-testing the questionnaire

Invite farmers to the training venue for conducting a pre-test with the enumerators. This will give enumerators the opportunity to conduct an interview with an actual person and observe where they need more explanation or guidance. They will gain experience and a better understand of the work that is expected from them. For the trainers it is an assessment of the quality of data that an enumerator can deliver, and whether the enumerator has sufficient understanding of the work.

After the pre-test collect all the questionnaires and go through each one and correct any mistakes or unclarities. Set aside some time to discuss the questionnaires with the enumerator individually if needed. Make sure that each enumerator fully understands all the questions and validate with the farmer whether the information collected is representing his/her opinions.

Fig 9: **Enumerators pre-testing the questionnaire in Sondu, Western Kenya**

Retrospective questioning exercise & feedback

After the pre-test (that same afternoon or the next morning) we would like to collect feedback from the enumerators. Before handing out the questionnaires with our comments collect feedback from the group first assess the general feeling of the pre-test.

Question 1: What Went Well?

First we want to know what you think what went well? Did you enjoy spending time with the respondent and hearing how they manage their farm? Did you learn something new? Were you surprised by some of the answers? This will allow us to acknowledge all the good things that have happened, too.

Question 2: What Didn't Go So Well?

Since this is the first time you conducted this questionnaire it is very likely that you were unsure about how to ask certain questions or what to write down in the questionnaire after you have listened to the response from your respondent. What improvements can we make or can you make as an individual to improve the work? What things happened during the interview that you find difficult? Are there questions that are unclear or you would like to ask in a different way? Which sections of the questionnaire took more time than you initially thought?

In answering this question, it's important that we focus on things that actually happened - reflecting on the past and what *did* occur. For example,

- "We spent a long time drawing the farm sketch" rather than, "Drawing the farm sketch with all the details was taking too long".

Even though there doesn't seem to be much difference between the two statements above, it has a subtle difference. The first sentence is an observation of something that did not go well and allows for a discussion on how to improve on this. The second version gives a judgment and a preferred solution ('too detailed, takes too long') and doesn't allow for a discussion on which solution would be best. We want to avoid identifying solutions at this stage because doing so can limit our thinking on our options. By just noting the facts, we leave more room for deciding how we want to make improvements.

Keep the Team Positive

The questions above are different from each other on another level: while the first sentence states a fact, the second sentence states an argument. People are much more inclined to look at facts and try to solve the puzzle then to argue and confront a team member with a contrasting view. In order to keep energy flowing and create a positive team spirit we have to focus on what actually happened and on finding solutions. Try to create a positive atmosphere by avoiding leading questions, stating opinions and focusing on establishing an open dialogue in which we all work towards determining the right approach to conduct the interviews.

Question 3: What Have I Learned?

Reflecting on what we have learned will provide us with insights and increase our knowledge: we need to process our learning and synthesize what we have gained from this training. Reflecting individually and sharing this with the team can help others gain from your experiences too.

Question 4: What Still Puzzles Me?

It is also beneficial to identify areas you are still unsure of what the best approach is. These puzzles express questions that we still have or gaps in knowledge. For example if you struggled to get your respondent to answer a question or if you aren't sure the answer is the type of information we are looking for, it would be good to share it with the team. Either to share experiences or to identify a certain doubt, or topic as a challenge to which we need to identify a solution.

After finishing the 4-question retrospective we can devote some time to come up with improvements for the next training session (which may be with another group of trainees) or to share practical suggestions to get better results when we start our fieldwork.

Reference: Waite, L.M. and Lyons, C., 2013 (Adapted from http://agile.dzone.com/articles/%E2%80%9C-4-questions%E2%80%9D-retrospective)

Data entry

Data is entered into a Census and Survey Processing System (CSPro) which is a public domain software package distributed freely by the United States Census Bureau. CSPro is used for data entry, editing, tabulation and dissemination of census and survey data.

Data entry into CSPro

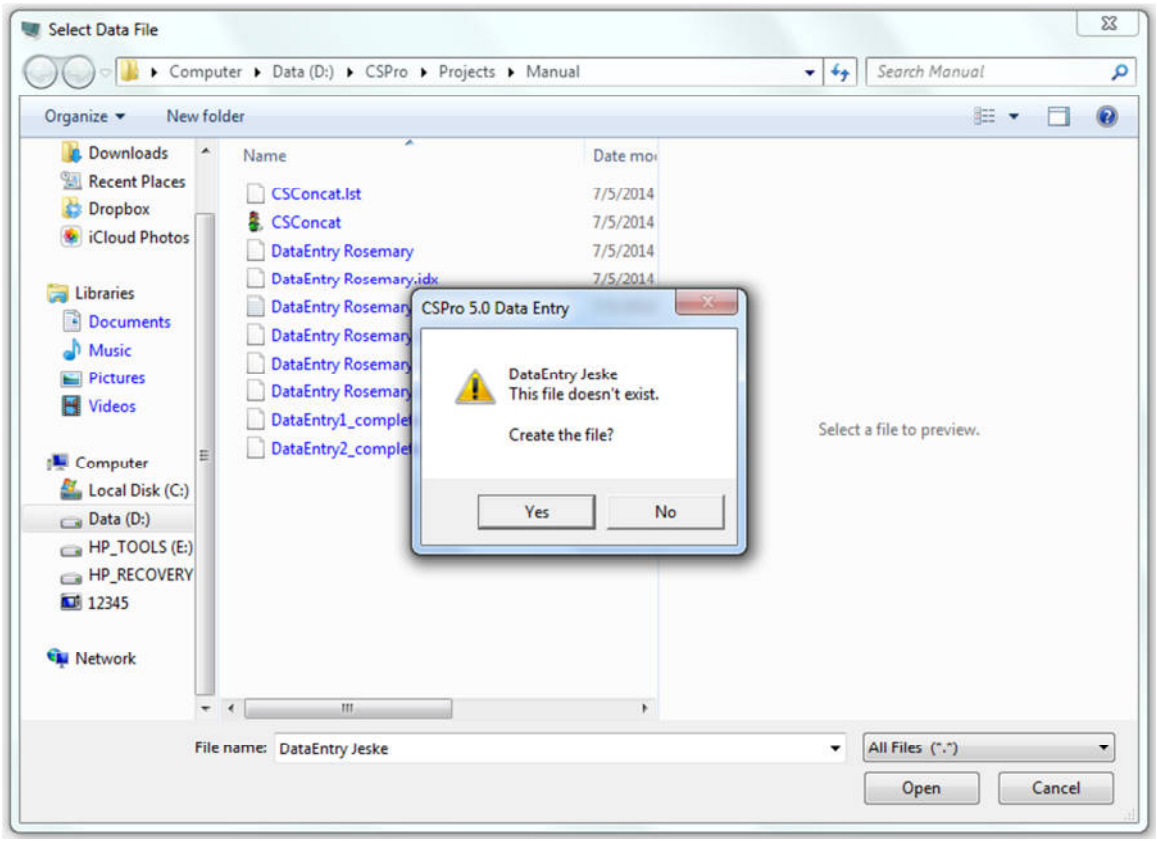
Download and install the latest version of the software package CSPro. We used version 5.0.3 *released 8-8-2013*). The software is downloadable via http://www.census.gov/population/international/software/cspro/csprodownload.html

In this manual we will briefly describe the steps that are needed to get data entry clerks started. For a more detailed account on the data entry process we refer to a '***Data Entry Quick Start Guide – using CSPro for Data Entry***' developed by Paul Baraka from the World Agroforestry Center (Baraka, 2012). More useful materials are listed at the end of the chapter. For a more detailed account of building data entry applications in CSPro I refer to the documentation available on the US Census bureau's website http://www.census.gov/population/international/software/cspro/.

In this manual we have used a data entry application which is part of the project "Linking genetic vulnerability to loss of resilience to adapt to climate change". For the purpose of this manual we will refer to this dataset. If you wish to use the data entry application contact the author (j.vandegevel@cgiar.org) . All the materials will eventually be made publicly available through the CCAFS dataverse website (http://ccafs.cgiar.org).

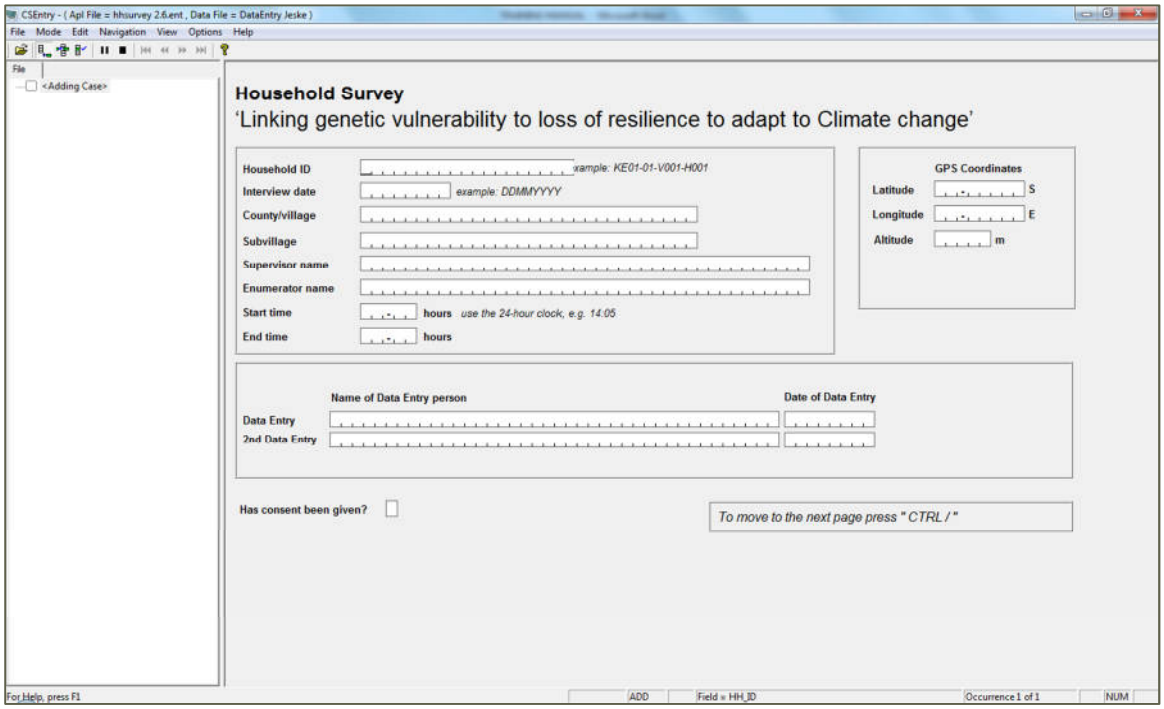
1. Load the data entry application (hhsurvey 2.6) by starting CSPro and 'opening an existing application'. Double-click on hhsurvey2.6.ent to open the file.

2. Press the traffic light symbol to create a new data entry file and locate the folder in which you want to save your file. Give your data entry file a unique name, for example your first name. After pressing "Open" you will receive a message that your file does not exist. "Create the file?". Press "Yes".

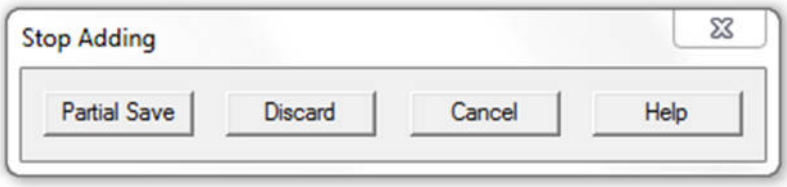


3. You will be asked for an Operator ID. Type your name here. Click “OK”.

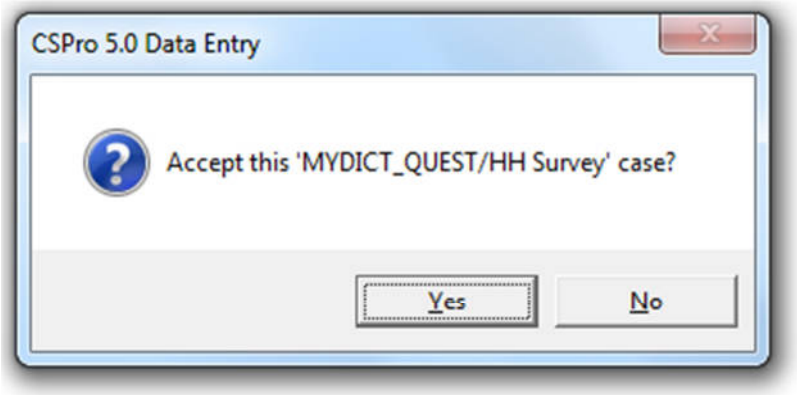
4. The first page of the survey appears in the screen. It should look similar to the screenshot below. After filling the first field the cursor will move to the next field. To skip a field, press enter. To move to the next page press “CTRL / ”. To move between pages use the “Page Up” or “Page Down” commands.



5. To stop entering data, select “Stop” from the “Mode” menu, or click “Stop” on the toolbar. The “Stop Adding” window will open; click “Partial Save” if you wish to come back to the same questionnaire or “Discard” if you wish to delete the case (this cannot be reversed).



After typing in every field from the questionnaire into the data entry file and completing the case you will be prompted to accept the case. Press “Yes” and the case will appear on the right of the screen. Press “F8” to clear pop up messages. They will appear when you leave one of the fields empty (in this data entry application some of the fields are supposed to be left empty). You can press the “Add Case” button to start entering a new case. Double-click on an existing case to modify.



6. After finishing a session of data entry you can save your cases by pressing “Stop” and exit the CSPro program. Make sure you share your data entry file with your supervisor for quality checks. Note down your name and date on each questionnaire before putting them back on the pile.

Data entry supervision

It is important to keep track of the data entry progress to avoid duplication. Keeping track of the progress allows you to calculate how many data entry clerks you need to hire for how many days and adjust this number to be able to meet your deadlines. Depending on the speed and experience one person can enter 7-10 questionnaires per day. See annex 2 for a control sheet for data entry.

Quality control

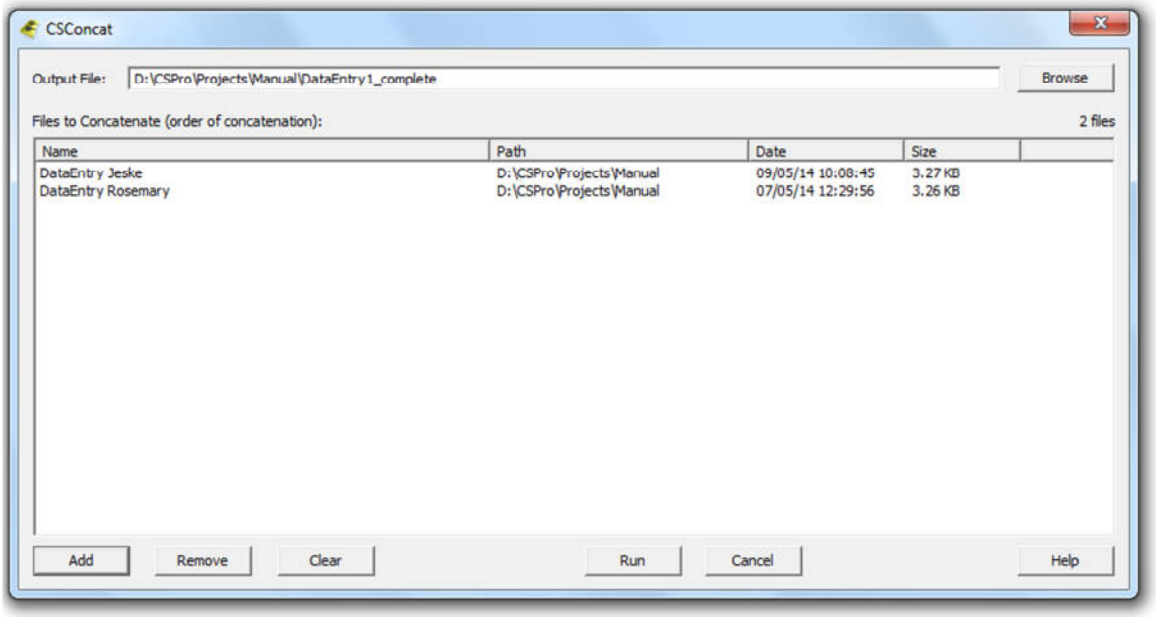
CSPro will produce Operator Statistics (under 'View' after opening a data entry file) that will measure speed and accuracy of the data entry clerk.We suggest a quality check every 7th questionnaire to signal common mistakes early in the process and improve the overall quality of the data entered.

Double data entry

The same questionnaire will be entered two times by different people. This so-called 'double data-entry' is an established method for finding errors in the data entry. The data are entered by one person and then re-entered into a different data file by a second person. The resulting data files are then compared and any discrepancies are checked against the original (paper) questionnaire. Corrections are then made to both data files (SSC, 2012). Double data entry will increase the reliability of the data (assuming two people will not make the same mistake) and will make the data cleaning process more manageable.

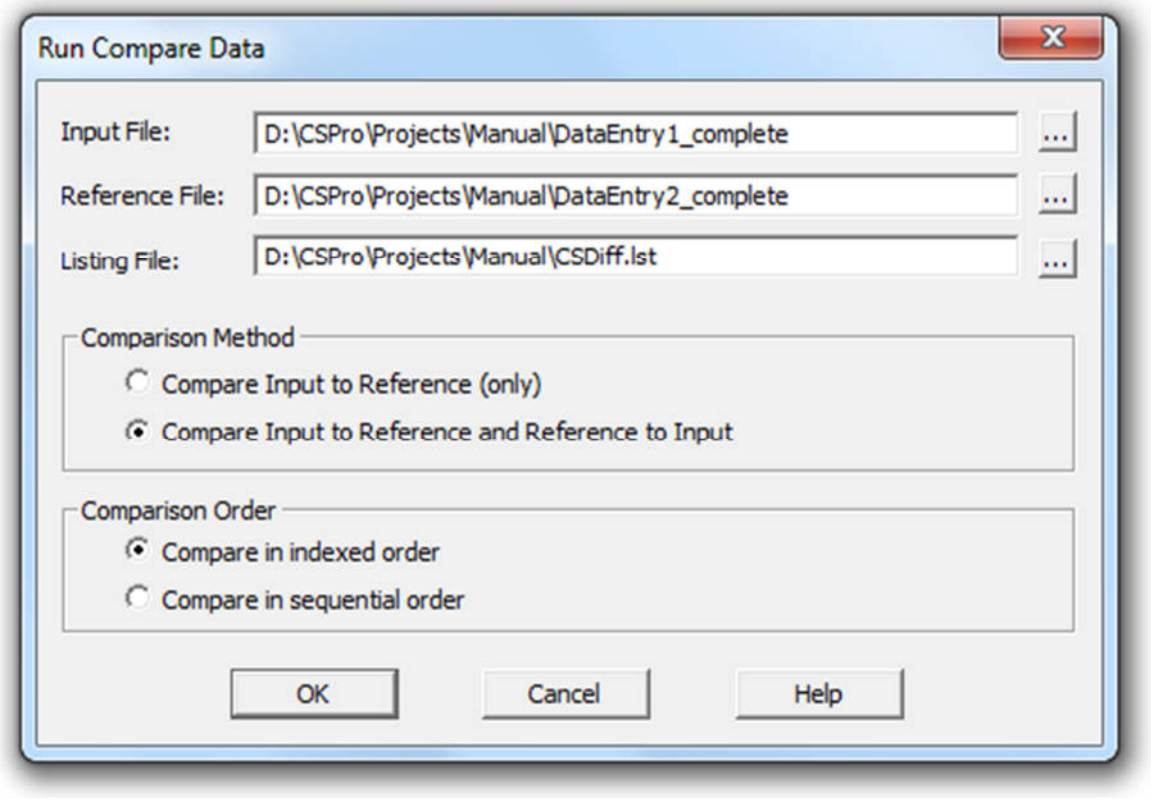
Concatenate and compare data

After completing the double-data entry we need to compile all the data entry files into two files: a first data entry and second data entry. Each data entry clerk will have its own data entry file and all files need to be concatenated. In CSPro go to "Tools" and select "Concatenate Data". Select the data entry files of each data entry clerk and press "Add". They will be visible in the window under 'Name'. Specify the Output File by selecting the folder in which you want to save the output and giving the file a unique name. In this case (DataEntry_complete). Press "Run" and a window will pop up indicating the concatenation is completed. If there are duplicates (e.g. the same questionnaire entered twice) you will receive an error message. You need to remove the duplicate case to be able to put the files together.



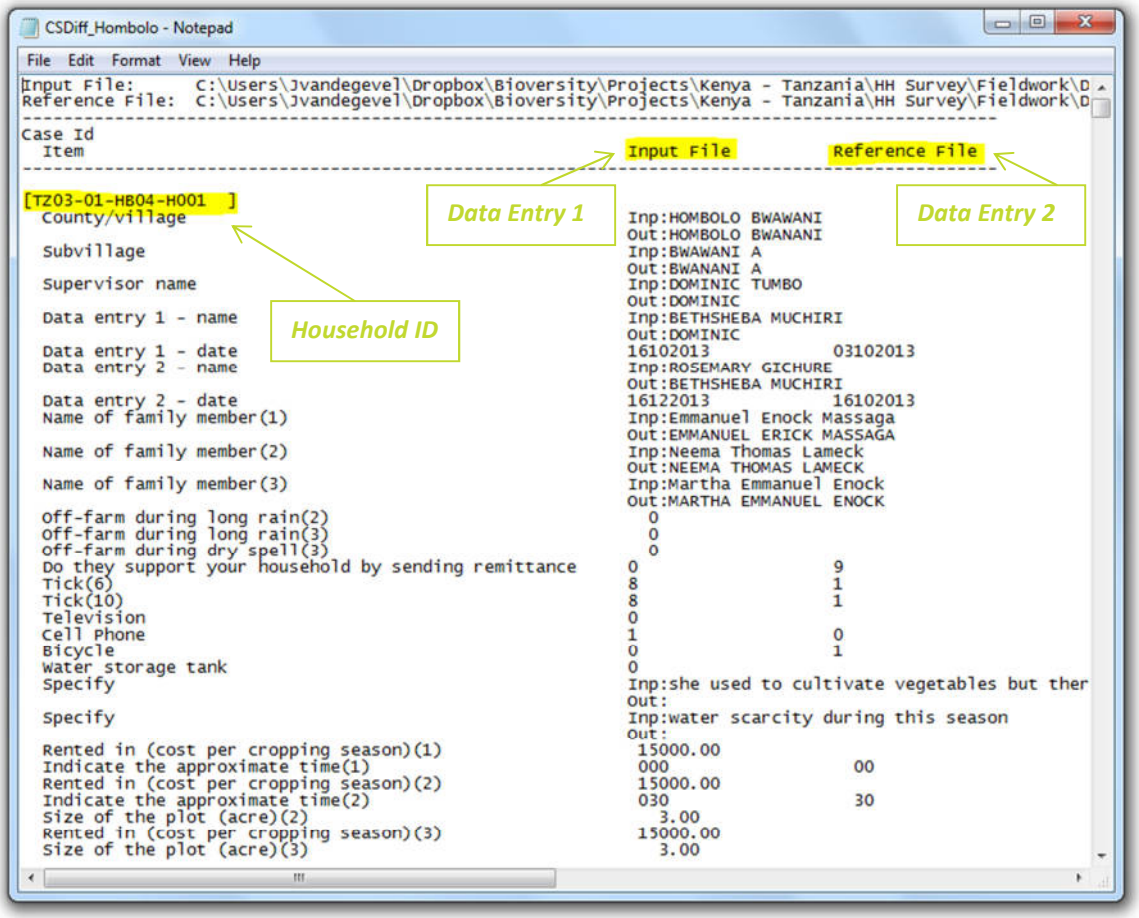
Repeat the same process for the second data entry. You will now have two files 'DataEntry1_complete' and 'DataEntry2_complete' which can be compared to list the differences.

Go to "Tools" and select "Compare Data". Open the dictionary file 'hhsurvey 2.6' and select all the variables you wish to compare (check the box next to MyDict to select all). Select 'Compare Input to Reference and Reference to Input' as a Comparison
This will also take into account any extra fields in both the Input and the Reference file. For the Comparison Order select 'Compare in indexed order' since our questionnaires are sorted by the identification number.



Press the "Run"  button. You are asked to specify the Input and the References files. The input file is the file that you want to improve (e.g. take out the mistakes). In our case the input file is DataEntry1_complete and the reference file is DataEntry2_complete. After running the comparison CSPro will give the results in a listing file named 'CSDiff.lst'.

You can use this document to correct your Input File. The analysis team should be involved at this stage to determine which differences need to be 'cleaned' (e.g. corrected using the original paper questionnaires and editing the cases in CSPro) and which differences are obvious mistakes which can be corrected in CSPro or in a later stage after exporting the data.



In the CSDiff file you can see above the questionnaire from household TZ03-01-HB04-H001 contains differences between the input and the reference file.

For example the village name is misspelled in the reference file (Hombolo Bwanani instead of Hombolo Bwawani)

Or some of the codes for household assets (Television, Cell Phone, Bicycle are different or omitted). To correct the indication for Bicycle (second line from the bottom) we go back to the original paper questionnaire to verify whether or not the household owns a bicycle. In this case they own a bicycle so the input file has erroneous listed a '0' in the data entry file.

Making corrections

We need to correct the code for bicycle in this case. Open the data entry file 'DataEntry1_complete' and double click on the case named 'TZ03-01-HB04-H001'. Using "Page Up" move to the page which contains the question about the assets and locate Bicycle. Place the mouse on the field next to the label 'Bicycle' and type in a "1" overwriting the "0". Make sure the cursor moves to the next row and the field is indicated in green. After the correction is made press "Stop" and a window will pop up asking you to save the modifications. Press "Finish" to save and accept the modified case.

After all the corrections are made we re-run the comparison to find out if there are still differences that need correction. It is possible that new errors are introduced when making the corrections.

Export data

Go to "Tools" and select "Export Data". Open the Data Dictionary Application 'hhsurvey2.6' and press "Open". In the next screen select the variables you want to export. In our case we want to select all variables and we tick the box next to 'MyDict'.

Two ways to export data

There are two ways of exporting your data. If you wish to have all variables into *one file* select the radio button 'One File' under 'Number of files created' and 'All in one record' for the 'Output of Multiple Record Occurrences'. The output lists the results in one document and one line contains a complete questionnaire.

The second method of outputting is exporting your data into *multiple files*. Select 'Multiple Files' and 'As separate Records'. The output lists the results in separate documents for each of the topics (e.g. Cover Page, Identification, Family members, etc.). One row still represents one questionnaire.

Subitems

Under 'Export Items or SubItems' select 'Both Items and Subitems'. For the 'Export Format' CSPro offers a variety of formats to match the software you will use for your analysis. In case you wish to further clean up the database in Microsoft Excel select Semicolon delimited (.csv). Press "Run" and select the file you want to export. In our case this is the corrected version of DataEntry1_complete. Accept the names that CSPro automatically gives the file or files.

Links to useful materials

1. Data Entry Quick Start Guide – using CSPro for Data Entry by Paul Baraka, 2012
   http://worldagroforestry.org/research-methods/sites/default/files/STEPS%20TO%20BEGIN%20DATA%20ENTRY_0.pdf
2. The US Sensus bureau has published three CSPro user guides (Getting Started Guide, Complete User Guide and Data Entry User's Guide) that can be downloaded from their website: http://www.census.gov/population/international/software/cspro/csprodocs.html
3. The University of Reading Statistical Services Centre has published very user-friendly CSPro tutorials on their YouTube channel
   https://www.youtube.com/playlist?list=PLg1i766TIlKa7AkDZ6lX7HXqBppVPUln2

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Annex 1: List of key technical terms and their local definitions for use in the FGD

Nr	English	Swahili	Kipsigy	Luo
	Objective: To understand experience based farming knowledge and practices for adaptation to climate change (to recover, mitigate, and manage from agricultural risks and climate change).	Kuelewa ujuzi na mafunzo ya kilimo kulingana na mabadiliko ya hali ya anga na vile vile mbinu za kustahimili mabadiliko ya anga	Kiguiyo ngomnatet ne kikenyor en naet ab temisiet kosubge ak waletab koristo si kiyan kewelel ortinwek che kilongunen temisiet	Wange wach gi puonj e pur maber kaluore gi lokruok manie ei kor lewasi
1	Climate change	Mabadiliko ya hali ya anga	Waletab koristo	Lokruok mar kor iwasi
2	Adaptation	Kubadilika na mabadiliko ya anga	Kiyau kewalak kouyewalakse koristo	Lokruok gi kor iwasi
3	Resilience	Ujasiri	Kimuch keter/kesindan kit ne kanyo	Bedo gi mijingo
4	Calamities	Janga la hali ya anga	Nyasutik/kewelutik	Thakruok mikelo gi lokruok lwasi
5	Perception	Mtazamo wa ndani wa hali ya mabadiliko ya hali ya anga	Olekigerto/olokibwatito	Paro mag kor lwasi
6	Environment	Mazingira	Atebtab emet	Aluora
7	Long rain season	Mvua wa mwaka/msimu mrefu wa mvua	Iwot/ropta ne koi	Chwiri
8	Short rain season	Msimu mfupi wa mvua/mvua ya nusu ya mwaka	Ropta ne wach	Opon
9	Agrobiodiversity	Kilimo cha aina tofauti ya mimea ya wanyama	Temisietab tuguk che terter	Pith/pur makgik mopogore
10	Change (what has it changed)	Mabadiliko	Walet	Lokruok (ango mose lokore)
11	Effect (how it changed)	Athari za mabadiliko	Kit hebitu	Gima okelo (olokorenade)

Nr	English	Swahili	Kipsigy	Luo
12	Impact	Kinachoonyesha mabadiliko	Kit netagunen	Gima obiro kelo
13	Vulnerability	Kutoweza kustahimili	Komakimuch keter kit ne kanyo	Koso nyalo
14	Adaptation strategy	Namna/njia tofauti ya kukabiliana na mabadiliko ya anga	Oret ne kiyae si kimukta kiy	Gik mitimo mondo edhigi lokruok
15	Land use	Matumizi ya ardhi/jinsi ya kutumia ardhi	Boisyet eu imbar	Kaka itiyogi puothi
16	Agricultural practice	Mbinu tofauti za kilimo(kupanda,kupalilia)	Ortinwekab temisiet	Yore mag pur
17	Inter-specific diversity (species diversity).	Utofauti wa aina nyingi maalum za mimea na wanyama/mifugo	Keswek ab minutik/tiongik che terter	Pur mar cham/pith mopogore
18	Intra-specific diversity (variety level diversity).	Utofauti kati ya aina Fulani ya mimea au mifugo Fulani	Terchinetab keswekab minutiet/tiondo kou –mosongik	cham mopogore mar kodhi/jamni
19	Variety (Landrace)		Terch inetab keswek	Mbegu(kodhi)
20	Sorghum	Mtama	Mosongik	Bel
21	Cowpea	Kunde	Chepngach	Boo
22	Pigeon pea	Mbaazi	n/a	n/a
23	Off-farm income	Mapato yasiyotokana na kilimo kama asali kuuza chakula cha mifugo na makaa	Meleckto ne na bunu imbar	Epuodho maok mari(yuto miyudo epuodho maokmari)
24	On-farm income	Mapato yanayotokana na kilimo kama mboga,matunda na kuuza chakula cha mifugo	Meleckto ne bunu imbar	Epuodhi (yuto maiyudo epuothi)
25	Morphological characteristics (traits)	Maumbile ya mimea au mifugo kwa kutofautanisha.	Oleu keswek ne boru terjinet	Pogruok manitie gimoro
26	Indigenous variety	Mbegu za kienyenji	Kesekab gaa	Koth nyaluo
27	Acquired variety/Hybrid	Mbegu kutoka nje/za kizunguni	Keswek chetoek	Kodhi maoko

Annex 2: Individual household questionnaire

Household Survey

'Linking genetic vulnerability to loss of resilience to adapt to Climate change'

Introduction and consent by main respondent

Before the beginning of the interview read out the following paragraph and ensure that the respondent understands before asking for consent.

Greetings/salutation: My name is .... and I am working for .... On behalf of ABCIC (African Biodiversity Conservation and Innovation Centre) with permission from the local government we are conducting a survey on farming practices, focusing on Sorghum, Cowpea and Pigeon pea and we want to asses the levels of diversity on your farm. We would like to ask you some questions that should take no more than three hours of your time. We would like to share some of this information widely in order that more people understand how you use ***cultural knowledge and traditional farming practices to recover, mitigate and manage agricultural risks and weather related calamities.***

Your name will not appear in any data that is made publicly available. The information you provide will be used purely for research purposes; your answers will not affect any benefits or subsidies you may receive now or in the future. Do you consent to be part of this study? You may withdraw from the study at any time and if there are questions that you would prefer not to answer then we respect your right not to answer them.

Has consent been given? (01=Yes; 00=No) [___]

1	Interview date	[__/__/____]	Start [__:__] End [__:__]
2	Household ID		
4	Village		
5	Sub village		
6	Enumerator name		
7	Latitude: S Longitude: E Altitude meters ASL	[_____S] [_____E] [_____M]	Date:
8	Supervisor name		[__/__/____]
9	Data entry 1 – name		[__/__/____]
10	Data entry 2 – name		[__/__/____]

Note: Take GPS coordinate at the main house of the homestead.

A. Identification

Total number of family members who share the same kitchen. Include visitors who stay for more than 1 month.
Exclude family members who stay outside longer than 1 month.

1 Total household number [_____]

2.	Indicate main respondent with* and co-respondent with **	Nr	Indicate only household members who **engage fully in agricultural practices or other forms of employment.** (indicate full three names).	Age	Sex F/M	Relation with HHH 1. HHH 2.Wife, Husband 3.Son, Daughter 4.Mother, Father 5.Sister, Brother 6.House worker 7.Others	Education level. 1 None 2.Primary 3.Secondary 4.College/Uni 5.Adult edu.	Mobile contact
	[ ]	1	[_____]	[___]	[___]	[___]	[___]	[_____]
	[ ]	2	[_____]	[___]	[___]	[___]	[___]	[_____]
	[ ]	3	[_____]	[___]	[___]	[___]	[___]	[_____]
	[ ]	4	[_____]	[___]	[___]	[___]	[___]	[_____]
	[ ]	5	[_____]	[___]	[___]	[___]	[___]	[_____]
	[ ]	6	[_____]	[___]	[___]	[___]	[___]	[_____]

What activities are the household members engaged in?

3	Nr	Major Occupation: Agriculture and other household activities, business, employment specify below	Time commitment (in %) Long rain On-farm	Long rain Off-farm	Dry spell On-farm	Dry spell Off-farm	Off-farm work description
	1	[_____]	[___]	[___]	[___]	[___]	[_____]
	2	[_____]	[___]	[___]	[___]	[___]	[_____]
	3	[_____]	[___]	[___]	[___]	[___]	[_____]
	4	[_____]	[___]	[___]	[___]	[___]	[_____]
	5	[_____]	[___]	[___]	[___]	[___]	[_____]
	6	[_____]	[___]	[___]	[___]	[___]	[_____]

4 Do you have household members who have migrated?
O No
O Yes, specify [_____]
[_____]

5 Do they support your household by sending remittances or gifts?
O No
O Yes, on a monthly or quarterly basis
O Yes, once a year
O Yes, occasionally
Comments [_____]

B. Socio-economic and animal asset information

1 Main source of income. Tick where applicable or dash if not applicable. Rank from the highest option.

Tick		Rank
O	On-farm produce (crops, fruits, vegetables, fodder)	[___]
O	Other farm products (timber, fuelwood, charcoal, compost, honey, handicrafts).	[___]
O	Animal and animal products (livestock and livestock products, incl manure, eggs, etc specify [_____]	[___]
O	Renting out your own land or houses	[___]
O	Renting out your farm machinery or animals e.g. donkey transport, cow ploughing	[___]
O	Casual work (labour; temporary works),	[___]
O	Other payment from projects including pension, aid and subsidies	[___]
O	Small business	[___]
O	Food for work	[___]
O	Selling natural resources e.g. cutting trees, and soil/rock harvesting, etc.	[___]
O	Selling natural products e.g. honey, charcoal, bricks, handicrafts, gravel, etc.	[___]
O	Monthly salary	[___]
O	Gift from friends	[___]
O	Remittances or gift from family member	[___]
O	Food assistance	[___]
O	Community-based financial loan	[___]
O	Others, specify [_____]	[___]

2 Animal Assets

Animal assets	Number incl young
Cattle	[___]
Goats	[___]
Chicken	[___]
Chicks	[___]
Sheep	[___]
Donkey	[___]
Duck (Bata)	[___]
Pigs	[___]
Rabbit	[___]
Others Specify [_____]	[___]

3 **Which of the following items does your household own at the present time?**

	Tick or dash
Television	[__]
Cell Phone	[__]
Radio	[__]
Bicycle	[__]
Motorbike	[__]
Car	[__]
Animal Cart	[__]
Tractor	[__]
Farm implements	[__]
Mill (for grinding cereals or oilseeds)	[__]
Improved stove (gas cooker, etc.)	[__]
Battery (e.g. car battery for power)	[__]
Water pump	[__]
Thresher	[__]
Internet use	[__]
Bank account	[__]
Tape Recorder	[__]
Others	[__]

4 **Which of the following structures/utilities does your household have?**

	Tick or dash
Water storage tank	[__]
Well for hh water	[__]
Solar power	[__]
Running water in house	[__]
Hen house	[__]
Storage facility (seperate from house)	[__]
Water pond	[__]
Electricity from a grid	[__]
Irrigation	[__]
Improved roofing (tin, tiles, etc)	[__]
Biogas	[__]
Others	[__]

5	Have you applied, benefitted or were you involved in the following mechanisms in the last 12 months as a way of adaptation or coping with challenges faced? Tick when applicable or dash if not applicable.		
	MECHANISM	**Tick**	**Comment**
	Involved in CBOs and farmer associations	[___]	
	Extension services and farming training (incl. farm inputs)	[___]	
	Obtained credit or loans for agricultural activities (incl. seed loans)	[___]	
	Obtained weather based animal and crop insurance	[___]	
	Conflict over scarce natural resources	[___]	
	Sale of household assets	[___]	
	Post harvest processing and/or value addition	[___]	
	Traditional prayers	[___]	

6	Do you, or any other household member, belong to a group or groups doing the following activities?	
		Tick or dash
	Tree nursery/tree planting	[_____]
	Fish ponds	[_____]
	Fishing	[_____]
	Forest product collection	[_____]
	Water catchment management	[_____]
	Soil improvement activities	[_____]
	Crop introduction/substitution	[_____]
	Irrigation	[_____]
	Savings and/or credit	[_____]
	Marketing agricultural products (i.e. livestock, crops, tree or fish)	[_____]
	Productivity enhancement (i.e. livestock, crops, tree or fish)	[_____]
	Seed production	[_____]
	Vegetable production	[_____]
	Others not mentioned above related to soil, land or water management?	[_____]
	Specify [_____]	

C. Landscape and crop diversity management

For each plot (field) indicate the crops, trees, pastures. Also indicate the position of land marks, houses, home gardens, tree lots, wells, access roads, streams, terraces and slope when applicable. Indicate the subplots within the cultivated field.

		PLOT 1	PLOT 2	PLOT 3	PLOT 4	PLOT 5	PLOT 6
2	How many farming plots do you currently have for crops, animals, forest, house, etc., [_____]						
3	What is the main use of each plot						
	1. Crop	[____]	[____]	[____]	[____]	[____]	[____]
	2. Animal	[____]	[____]	[____]	[____]	[____]	[____]
	3. Marginal/fallow land	[____]	[____]	[____]	[____]	[____]	[____]
	4. Forest	[____]	[____]	[____]	[____]	[____]	[____]
	5. House	[____]	[____]	[____]	[____]	[____]	[____]
	6. Other, specify [_____]	[____]	[____]	[____]	[____]	[____]	[____]
4	If the answer to the previous question is 1 (crop plot), what is the percentage of the plot that you cultivate? *If needed note down calculations on back of page*	[____]	[____]	[____]	[____]	[____]	[____]
5	Type of crop plot.						
	1. Crops + Kitchen garden	[____]	[____]	[____]	[____]	[____]	[____]
	2. Crops only						
	3. Kitchen garden only						
6	Ownership of land						
	1. Owned	[_____]	[_____]	[_____]	[_____]	[_____]	[_____]
	2. Borrowed (from O relatives, O friends and neighbours O goverment land, O others, specify, [_____]						
	3. Rented in(cost per cropping season per unit area: [_____])						
	4. Rented out (return per cropping season per unit area: [ ])						
7	Location of the plot						
	1. Within the sub-village (hamlet)	[____]	[____]	[____]	[____]	[____]	[____]
	2. Within village						
	3. Within ward						
	4. Within division						
	5. Within the district						
	6. Outside of the district.						
8	Type of land.						
	1. Slope	[____]	[____]	[____]	[____]	[____]	[____]
	2. Hill top	[____]	[____]	[____]	[____]	[____]	[____]
	3. Flat	[____]	[____]	[____]	[____]	[____]	[____]
	4. Hollow	[____]	[____]	[____]	[____]	[____]	[____]
	5. River bed.	[____]	[____]	[____]	[____]	[____]	[____]
9	How do you get the plot? (indicate approx.time)	code hr min	code hr min	code hr min	code hr min	code hr min	code hr min
	1. on foot	[__][__:__]	[__][__:__]	[__][__:__]	[__][__:__]	[__][__:__]	[__][__:__]
	2. bicycle	[__][__:__]	[__][__:__]	[__][__:__]	[__][__:__]	[__][__:__]	[__][__:__]
	3. motor cycle	[__][__:__]	[__][__:__]	[__][__:__]	[__][__:__]	[__][__:__]	[__][__:__]
	4. public transport	[__][__:__]	[__][__:__]	[__][__:__]	[__][__:__]	[__][__:__]	[__][__:__]
	5. foot + public transport	[__][__:__]	[__][__:__]	[__][__:__]	[__][__:__]	[__][__:__]	[__][__:__]
10	Size of the plot (acre)	[____]	[____]	[____]	[____]	[____]	[____]
11	How much time do you spend on working in each field in a year? Describe in nr. of days per year. Total effort you can make in a year is 365 days						
	• Head of household	[____]	[____]	[____]	[____]	[____]	[____]
	• Spouse	[____]	[____]	[____]	[____]	[____]	[____]
	• Person(s) A (specifycosts if hired) [_____]	[____]	[____]	[____]	[____]	[____]	[____]
	• Person(s) B (specify costs if hired) [_____]	[____]	[____]	[____]	[____]	[____]	[____]
	• Person(s) C (specify costs if hired) [_____]	[____]	[____]	[____]	[____]	[____]	[____]

Question 11 *Calculations*	**PLOT 1**					**PLOT 2**					**PLOT 3**					**PLOT 4**					**PLOT 5**					**PLOT 6**				
	HHH	Wife	Pers A	Pers B	Pers C	HHH	Wife	Pers A	Pers B	Pers C	HHH	Wife	Pers A	Pers B	Pers C	HHH	Wife	Pers A	Pers B	Pers C	HHH	Wife	Pers A	Pers B	Pers C	HHH	Wife	Pers A	Pers A	Pers C
Preparing land	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]
Planting	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]
Weeding	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]
Weeding	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]
Fertilizing	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]
Pesticides	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]
Harvesting	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]
Threshing	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]
Cleaning	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]
Marketing	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]
Others	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]
TOTAL	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]

		PLOT 1	**PLOT 2**	**PLOT 3**	**PLOT 4**	**PLOT 5**	**PLOT 6**
12	Land assets in the plots						
1.	House	[_____]	[_____]	[_____]	[_____]	[_____]	[_____]
2.	Micro-catchments	[_____]	[_____]	[_____]	[_____]	[_____]	[_____]
3.	Terracing / bunds	[_____]	[_____]	[_____]	[_____]	[_____]	[_____]
4.	Stone lines	[_____]	[_____]	[_____]	[_____]	[_____]	[_____]
5.	Crop remain lines	[_____]	[_____]	[_____]	[_____]	[_____]	[_____]
6.	Hedges	[_____]	[_____]	[_____]	[_____]	[_____]	[_____]
7.	Irrigation	[_____]	[_____]	[_____]	[_____]	[_____]	[_____]
8.	Drainage	[_____]	[_____]	[_____]	[_____]	[_____]	[_____]
9.	Waterpan	[_____]	[_____]	[_____]	[_____]	[_____]	[_____]
10.	Seed nursery	[_____]	[_____]	[_____]	[_____]	[_____]	[_____]
11.	Animal house (shed)	[_____]	[_____]	[_____]	[_____]	[_____]	[_____]
12.	Animal enclosure (boma)	[_____]	[_____]	[_____]	[_____]	[_____]	[_____]
13.	Storage facility for : specify [_____]	[_____]	[_____]	[_____]	[_____]	[_____]	[_____]
14.	Others specify; [_____]	[_____]	[_____]	[_____]	[_____]	[_____]	[_____]
13	Land preparation and management methods						
1.	Animal ploughing	[_____]	[_____]	[_____]	[_____]	[_____]	[_____]
2.	Human ploughing	[_____]	[_____]	[_____]	[_____]	[_____]	[_____]
3.	Contour ploughing	[_____]	[_____]	[_____]	[_____]	[_____]	[_____]
4.	Mainly monocropping	[_____]	[_____]	[_____]	[_____]	[_____]	[_____]
5.	Mainly mixed cropping	[_____]	[_____]	[_____]	[_____]	[_____]	[_____]
6.	Mainly mixed seeding	[_____]	[_____]	[_____]	[_____]	[_____]	[_____]
7.	Chemical fertilizers	[_____]	[_____]	[_____]	[_____]	[_____]	[_____]
8.	Animal fertilizer and compost	[_____]	[_____]	[_____]	[_____]	[_____]	[_____]
9.	Chemical pesticides/herbicides	[_____]	[_____]	[_____]	[_____]	[_____]	[_____]
10.	Hybrid seeds	[_____]	[_____]	[_____]	[_____]	[_____]	[_____]
11.	Mechanized farming (indicate introduced machines [_____]	[_____]	[_____]	[_____]	[_____]	[_____]	[_____]
12.	Others specify; [_____]	[_____]	[_____]	[_____]	[_____]	[_____]	[_____]

14	Fill out the below table only for crop plots **CROPS GROWN THIS SEASON** Months: from [_____] to [_____] Tick: O Rain season O Dryseason	Variety name	Area: Size of subplot (acres)
Plot			

16	OTHER NO SEASONAL CROPS AND PERENIAL CROPS GROWN OR TAKEN CARE OF IN THE FARM		
Plot			

17	What are your 3 most important crops?	
	Crops for consumption	Cash crops
1		
2		
3		
18	What were your 3 most important crops 10 years ago?	
	Crops for consumption	Cash crops
1		
2		
3		

17. **Indicate the different products harvested from crops and trees this year.**

	Production		Sales			Human consumption			Stored Seeds		Inputs		
Product (varieties)	Production (quantity)	Unit of measure	Quantity	Unit of measure	Income local currency per unit	Quantity	Unit of measure	How much used in a week	Quantity	Unit of measure	Type of input: *Fertiliser, manure, pesticide, herbicide, compost*	Quantity	Unit of measure
	[ ]		[ ]		[ ]	[ ]		[ ]	[ ]			[ ]	
	[ ]		[ ]		[ ]	[ ]		[ ]	[ ]			[ ]	
	[ ]		[ ]		[ ]	[ ]		[ ]	[ ]			[ ]	
	[ ]		[ ]		[ ]	[ ]		[ ]	[ ]			[ ]	
	[ ]		[ ]		[ ]	[ ]		[ ]	[ ]			[ ]	
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	[ ]		[ ]		[ ]	[ ]		[ ]	[ ]			[ ]	

		Plot 1	Plot 2	Plot 3	Plot 4	Plot 5	Plot 6
18	Main use of the plot 10 years ago? 1. Crop 2. Animal 3. Marginal/fallow 4. Forest 5. House 6. Not owned that time 7. Not known 8. Other, specify [_____]	[___] [___] [___] [___] [___] [___] [___] [___]	[___] [___] [___] [___] [___] [___] [___] [___]	[___] [___] [___] [___] [___] [___] [___] [___]	[___] [___] [___] [___] [___] [___] [___] [___]	[___] [___] [___] [___] [___] [___] [___] [___]	[___] [___] [___] [___] [___] [___] [___] [___]
19	Do you grow newly introduced crop species and varieties that were distributed in your community in the last 5-10 years? Mention these species	[_____]					
20	What were the reasons for adopting newly introduced and distributed varieties of the crops mentioned in the previous question?	[_____]					
21	Which crops and varieties have you abandoned and for what reasons did you stop growing them?	[_____]					

22 For each month say whether the food you consume is mainly from your own farm or from other sources. In addition, which months if any you tend to find you do not have enough food to eat for your family.

Remember to fill in 1 or 2 for all the months for the first table (no blanks!), and a 1 only for the relevant months in the second table.

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Source of food	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]
	1=Mainly from own farm *2=Mainly from off farm (purchase/aid/other)*											
Shortage / struggle to feed the family	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]
	1=Shortage											

D. Focus crops: sorghum, cow pea and pigeon pea

Diversity, trends and changes in focus crop farming practices

1	How many varieties do you have and what are their (local) names? Only include varieties that you grow this year (*Tanzania: Dec 12 – Apr 13 and May – Nov*)	**SORGHUM** name [_____] [_____] [_____] [_____] [_____] [_____] [_____] [_____]	**COWPEA** name [_____] [_____] [_____] [_____] [_____] [_____] [_____] [_____]	**PIGEON PEA** name [_____] [_____] [_____] [_____] [_____] [_____] [_____] [_____]

	2	3	4	5	6	7	8	9	10
Variety names of your main varieties	What is the source of the variety?	Which is your best or preferred source for listed varieties?	To which category does each variety belong?	What is the status of each variety?	What was the status 5-10 years ago?	Do you save seeds for next seasons? (generally)	How often do you get seeds of the same variety from sources other than your own?	Which seeds do you currently store?	Do you think that 5 years from now you will still be growing this variety?
	1. own production/ kept 2. gift from relatives 3. gift from friend/ neighbours 4. gift from goverment or NGO, company 5. politicians 6. exchange with relatives & friends 7. purchase from relatives & friends 8. purchace from open market and shops 9. AgroVet shop 10. pick from wild enviroment 11. borrowing from someones fields 12. others specify	1.own production 2. gift from relatives 3. gift from friend/ neighbours 4. gift from goverment or NGO, company 5. politicians 6. exchange with relatives & friends 7. purchase from relatives & friends 8. purchace in market and shops 9. AgroVet shop 10. pick from wild 11. borrowing from someones fields	1. Traditional/local 2. Aquired from outside 3. Hybrid/improved seeds	1. Cultivated in large area by many farmers 2. Cultivated in large area by few farmers 3. Cultivated in small area by many farmers 4. Cultivated in small area by few farmers	1. Cultivated in large area by many farmers 2. Cultivated in large area by few farmers 3. Cultivated in small area by many farmers 4. Cultivated in small area by few farmers 5. This variety is new, and did not exist 5-10yrs ago	1 = Yes 0 = No *If answer is No, jump to question 10.*	*1 = every season* *2 = every 2 seasons (year)* *3 = every 2-5 yrs* *4 = every 5-10 yrs* *5 = more than 10 yrs or don't change at all.*	(Tick varieties)	1 = Yes 2 = No 99 = Don't know

	2	3	4	5	6	7	8	9	10
SORGHUM	code(s)	code(s)	code	code	code	1 = yes, 0 = no	code	tick	1 = yes, 0 = no
[_____]	[__][__][__]	[__][__][__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]
[_____]	[__][__][__]	[__][__][__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]
[_____]	[__][__][__]	[__][__][__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]
[_____]	[__][__][__]	[__][__][__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]
[_____]	[__][__][__]	[__][__][__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]
[_____]	[__][__][__]	[__][__][__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]
COWPEA									
[_____]	[__][__][__]	[__][__][__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]
[_____]	[__][__][__]	[__][__][__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]
[_____]	[__][__][__]	[__][__][__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]
[_____]	[__][__][__]	[__][__][__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]
[_____]	[__][__][__]	[__][__][__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]
[_____]	[__][__][__]	[__][__][__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]
PIGEON PEA									
[_____]	[__][__][__]	[__][__][__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]
[_____]	[__][__][__]	[__][__][__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]
[_____]	[__][__][__]	[__][__][__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]
[_____]	[__][__][__]	[__][__][__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]
[_____]	[__][__][__]	[__][__][__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]
[_____]	[__][__][__]	[__][__][__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]

11. What are the best (**+**) and the worst (**-**) traits in 3 main varieties you use? *Do not go through each row but ask what do they like about the varieties and what don't they like.*

		SORGHUM						COWPEA						PIGEON PEA					
Variety name		[_____] Var1		[_____] Var2		[_____] Var3		[_____] Var1		[_____] Var2		[_____] Var3		[_____] Var1		[_____] Var2		[_____] Var3	
		+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-
1)	Yield	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]
2)	Resistance to pest	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]
3)	Resistance to disease	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]
4)	Resistance to drougnt	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]
5)	Resistance to flood	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]
6)	Resistance to heat	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]

		Var1		Var2		Var3		Var1		Var2		Var3		Var1		Var2		Var3	
		+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-
7)	Resistance to cold	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]
8)	Bird attack	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]
9)	Maturity period (1= Short or 2= Long)	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]
10)	Perennial life (re-produce)	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]
11)	Seed quality	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]
12)	Colour or pattern of grain	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]
13)	Seed availability	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]
14)	Seed cost	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]
15)	Fertilizer required	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]
16)	Pesticide / insectside required	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]
17)	Height of crop (1= Short or 2= Long)	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]
18)	Threshability	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]
19)	Storage capacity/ characteristics	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]
20)	Germination	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]
21)	It can retain the characteristics for long period	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]
22)	Market price / value	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]
23)	Size of grain (1=Small or 2= Large)	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]
24)	Weight of grain (1= Light or 2= Dense)	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]
25)	Hardness of grain (1= Soft or 2= Hard)	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]
26)	Hardness of pod (1= Soft or 2= Hard)	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]
27)	Hardness of stem (1= Soft or 2= Hard)	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]
28)	Taste of grains	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]
29)	Taste of stems	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]
30)	Taste of leaves	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]
31)	Texture	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]
32)	Smell / aroma	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]
33)	Multiple uses (human) and functionality	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]
34)	Animal use	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]
35)	Suited for local food preparation (specify which traits [_____]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]
36)	Nutrition value	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]
Others specify:																			
[_____]		[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]
[_____]		[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]
[_____]		[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]	[__]

12	Do you plan to sell your current crop harvest? O Yes, O No, skip to question 14 If the answer is Yes who do you sell your crop to? *(more than one answer possible)*	**SORGHUM** [_____]	**COWPEA** [_____] *1. Relatives, neighbours (other home consumers) / 2. Brewers / 3. Manufacturers/ 4. Traders/ 5.Others*	**PIGEON PEA** [_____]
13	Average local price per unit in your market (indicate unit, and price in local currency)	**SORGHUM** [_____]	**COWPEA** [_____]	**PIGEON PEA** [_____]
14	What major challenges are you facing, if any, in accessing and using seeds? (in general, not only for the varieties grown	**SORGHUM**	**COWPEA**	**PIGEON PEA**
15	What post-harvest methods do you use to conserve seeds/planting materials? If needed specify for each variety.			

16 What changes have you made in the way you manage your land, soil and water in the last 5-10 years? *Go through this list row by row. Make sure not to leave any out.*

	Tick	Give main motives/reasons for making these changes
Introduced agroforestry	O	[ ]
Introduced intercropping or mixed cropping	O	[ ]
Introduced crop cover	O	[ ]
Introduced cash crops e.g. pawpaw, banana, grape	O	[ ]
Changed from using local varieties to hybrids	O	[ ]
Built shallow well	O	[ ]
Built bore hole	O	[ ]
Introduced terraces	O	[ ]
Introduced stone lines	O	[ ]
Introduced hedges	O	[ ]
Introduced contour ploughing	O	[ ]
Introduced rotations	O	[ ]
Introduced irrigation	O	[ ]
Introduced drainage	O	[ ]
Introduced mechanized farming	O	[ ]
Earlier land preparation	O	[ ]
Earlier planting	O	[ ]
Later planting	O	[ ]
Mixed farming: both crop and livestock farming	O	[ ]
Started using or increased use chemical fertilizers	O	[ ]
Started using manure/compost	O	[ ]
Start using or increased use pesticides/herbicides	O	[ ]
Change in processing and storage techniques	O	[ ]
Changed from crops to livestock	O	[ ]
Sale of assets to buy cereals	O	[ ]
Reduced area under cultivation	O	[ ]
Other, specify	O	[ ]

E. Perceptions on Climate Change and adaptation strategies

1	**Statements (compare with 10 years ago).** *Go through the questions one by one. Make sure not to leave any out.*	**Strongly agree**	**Slightly agree**	**Neutral**	**Slightly disagree**	**Strongly disagree**
1.	Do you believe that there is now a more severe dry season?	[_]	[_]	[_]	[_]	[_]
2.	It has become more difficult to predict when the rains will start.	[_]	[_]	[_]	[_]	[_]
3.	Temperatures have increased	[_]	[_]	[_]	[_]	[_]
4.	Floods have become more frequent	[_]	[_]	[_]	[_]	[_]
5.	Yields are higher now because of changes in climate.	[_]	[_]	[_]	[_]	[_]
6.	Modern varieties are more susceptible to changes in climate.	[_]	[_]	[_]	[_]	[_]
7.	I will have to change my land management practices to protect my crop from heavy rainfall.	[_]	[_]	[_]	[_]	[_]
8.	Climate change is not a big issue because I will be able to adapt my practices to new conditions	[_]	[_]	[_]	[_]	[_]
9.	If you plant only one variety you will have more pests than if you grow more varieties	[_]	[_]	[_]	[_]	[_]
10.	I need to get varieties more adapted to drought conditions	[_]	[_]	[_]	[_]	[_]
11.	I need to get more climate and weather information	[_]	[_]	[_]	[_]	[_]
12.	The dry season has become shorter	[_]	[_]	[_]	[_]	[_]
13.	Temperatures have decreased	[_]	[_]	[_]	[_]	[_]
14.	People having more seed sources do better in coping with the calamities (droughts, floods, heat, frost, soil erosion/ landslides, ..)	[_]	[_]	[_]	[_]	[_]

2	Which effects have you observed in the past 10 years? *Go through the list one by one*	**Increase**	**Decrease**	**Not different**	**Most significant effects (tick 3)**	**Adaptation strategies for the most significant effects (probe on land use and management changes)**
	Total Amount of rainfall	[_]	[_]	[_]	[_]	
	Onset (start) of rainy season* (early=increase, late=decrease)	[_]	[_]	[_]	[_]	
	Duration of rainy season	[_]	[_]	[_]	[_]	
	Temperature Intensity	[_]	[_]	[_]	[_]	
	Nr. of hot days	[_]	[_]	[_]	[_]	
	Forest and vegetation cover	[_]	[_]	[_]	[_]	
	Nr. of (wild) plant species and their habitats	[_]	[_]	[_]	[_]	
	Nr. of (wild) animal species and their habitats	[_]	[_]	[_]	[_]	

Nr. of dry months a year	[_ _]	[_ _]	[_ _]	[_ _]	_____
Incidence of crop failure/famine	[_ _]	[_ _]	[_ _]	[_ _]	_____
Incidence of floods	[_ _]	[_ _]	[_ _]	[_ _]	_____
Incidence of weeds	[_ _]	[_ _]	[_ _]	[_ _]	_____
Outbreaks of pests or diseases	[_ _]	[_ _]	[_ _]	[_ _]	_____
Resistance to pest /disease	[_ _]	[_ _]	[_ _]	[_ _]	_____
New crop pests have come	[_ _]	[_ _]	[_ _]	[_ _]	_____
New crop diseases have come	[_ _]	[_ _]	[_ _]	[_ _]	_____
Watertable (how deep you dig to find water)	[_ _]	[_ _]	[_ _]	[_ _]	_____
Land fertility/ productivity	[_ _]	[_ _]	[_ _]	[_ _]	_____
Length of growing period	[_ _]	[_ _]	[_ _]	[_ _]	_____

	Statement		Tick applicable climate characteristics and rank top 3 criteria where indicated.		
			Tick	Rank	Criteria
3	What is the major calamity in your community and rank them?		O	[_ _]	Drought
			O	[_ _]	Floods
			O	[_ _]	Erratic rain/soil erosion, hailstones
			O	[_ _]	Frost
			O	[_ _]	Strong Wind
			O	[_ _]	Crop diseases, specify: [_____]
			O	[_ _]	Crop pests, specify: [_____]
4	Having satellite fields (away fields) is important to cope with calamities	**Score** 1. Strongly agree 2. Slightly agree 3. Neutral 4. Slightly disagree 5. Strongly disagree 99. Don't know/No idea **Score [_ _]**			

E. Perceptions on Climate Change and adaptation strategies

1	**Statements (compare with 10 years ago).** *Go through the questions one by one. Make sure not to leave any out.*	**Strongly agree**	**Slightly agree**	**Neutral**	**Slightly disagree**	**Strongly disagree**
1.	Do you believe that there is now a more severe dry season?	[_]	[_]	[_]	[_]	[_]
2.	It has become more difficult to predict when the rains will start.	[_]	[_]	[_]	[_]	[_]
3.	Temperatures have increased	[_]	[_]	[_]	[_]	[_]
4.	Floods have become more frequent	[_]	[_]	[_]	[_]	[_]
5.	Yields are higher now because of changes in climate.	[_]	[_]	[_]	[_]	[_]
6.	Modern varieties are more susceptible to changes in climate.	[_]	[_]	[_]	[_]	[_]
7.	I will have to change my land management practices to protect my crop from heavy rainfall.	[_]	[_]	[_]	[_]	[_]
8.	Climate change is not a big issue because I will be able to adapt my practices to new conditions	[_]	[_]	[_]	[_]	[_]
9.	If you plant only one variety you will have more pests than if you grow more varieties	[_]	[_]	[_]	[_]	[_]
10.	I need to get varieties more adapted to drought conditions	[_]	[_]	[_]	[_]	[_]
11.	I need to get more climate and weather information	[_]	[_]	[_]	[_]	[_]
12.	The dry season has become shorter	[_]	[_]	[_]	[_]	[_]
13.	Temperatures have decreased	[_]	[_]	[_]	[_]	[_]
14.	People having more seed sources do better in coping with the calamities (droughts, floods, heat, frost, soil erosion/ landslides, ..)	[_]	[_]	[_]	[_]	[_]

2	Which effects have you observed in the past 10 years? *Go through the list one by one*	**Increase**	**Decrease**	**Not different**	**Most significant effects (tick 3)**	**Adaptation strategies for the most significant effects (probe on land use and management changes)**
	Total Amount of rainfall	[_]	[_]	[_]	[_]	
	Onset (start) of rainy season* (early=increase, late=decrease)	[_]	[_]	[_]	[_]	
	Duration of rainy season	[_]	[_]	[_]	[_]	
	Temperature Intensity	[_]	[_]	[_]	[_]	
	Nr. of hot days	[_]	[_]	[_]	[_]	
	Forest and vegetation cover	[_]	[_]	[_]	[_]	
	Nr. of (wild) plant species and their habitats	[_]	[_]	[_]	[_]	
	Nr. of (wild) animal species and their habitats	[_]	[_]	[_]	[_]	

Nr. of dry months a year	[_ _]	[_ _]	[_ _]	[_ _]	_____
Incidence of crop failure/famine	[_ _]	[_ _]	[_ _]	[_ _]	_____
Incidence of floods	[_ _]	[_ _]	[_ _]	[_ _]	_____
Incidence of weeds	[_ _]	[_ _]	[_ _]	[_ _]	_____
Outbreaks of pests or diseases	[_ _]	[_ _]	[_ _]	[_ _]	_____
Resistance to pest /disease	[_ _]	[_ _]	[_ _]	[_ _]	_____
New crop pests have come	[_ _]	[_ _]	[_ _]	[_ _]	_____
New crop diseases have come	[_ _]	[_ _]	[_ _]	[_ _]	_____
Watertable (how deep you dig to find water)	[_ _]	[_ _]	[_ _]	[_ _]	_____
Land fertility/ productivity	[_ _]	[_ _]	[_ _]	[_ _]	_____
Length of growing period	[_ _]	[_ _]	[_ _]	[_ _]	_____

	Statement		Tick applicable climate characteristics and rank top 3 criteria where indicated.
			Tick Rank Criteria
3	What is the major calamity in your community and rank them?		O [_ _] Drought O [_ _] Floods O [_ _] Erratic rain/soil erosion, hailstones O [_ _] Frost O [_ _] Strong Wind O [_ _] Crop diseases, specify: [_____] O [_ _] Crop pests, specifiy: [_____]
4	Having satellite fields (away fields) is important to cope with calamities	**Score** 1. Strongly agree 2. Slightly agree 3. Neutral 4. Slightly disagree 5. Strongly disagree 99. Don't know/No idea **Score [_ _]**	

5 People growing more food types or have more on farm diversity do better in coping with calamities **Score [_ _]**

If score of this statement is 1 or 2, tick calamities that are applicable for this respondent, and indicate which crop varieties survive better

Calamity	Crop/ crop variety/ies surviving better
O Drought	[_____]
O Floods	[_____]
O Erratic rain/soil erosion, hailstones	[_____]
O Frost	[_____]
O Wind	[_____]
O Crops diseases, specify	
[_____]	[_____]
[_____]	[_____]
O Crop pests, specify	
[_____]	[_____]
[_____]	[_____]

Tick calamities that are applicable for this respondents, and indicate which crop varieties fail seriously

Calamity	Crop/ crop variety/ies failing seriously
O Drought	[_____]
O Floods	[_____]
O Erratic rain/soil erosion, hailstones	[_____]
O Frost	[_____]
O Wind	[_____]
O Crop diseases, specify	
[_____]	[_____]
[_____]	[_____]
O Crop pests, specify	
[_____]	[_____]
[_____]	[_____]

6 I have to change my farming practices to adapt to calamities **Score [_ _]**

HOW (e.g)

1. Getting more different types and varieties of crops
2. Getting more modern varieties or hybrid.
3. Getting more local varieties.
4. Introducing irrigation
5. Making terracings
6. Allocation of labour
7. Starting casual labour. Rely on more off-farm income.
8. Increase or decrease number of farms
9. Increase or decrease number of animals

If score of is 1 or 2, for experienced calamities indicated, describe the practices that help to adapt to it.

O Drought HOW: [_____]

O Floods HOW: [_____]

O Erratic rain/soil erosion ,hailstones HOW: [_____]

O Frost HOW: [_____]

O Strong Wind HOW: [_____]

O Crop diseases, specify: [_____] HOW:

O [_____]

Crop pests, specify: [_____] HOW: [_____]

7	People who in addition also had naturally growing food e.g wild fruits, vegetables (so-called famine foods) survive better in times of calamities than those who did not have access to these foods.	**Score [_ _]**	Local names of such foods [_____] [_____] [_____] [_____] [_____]	[_____] [_____] [_____] [_____]

8	Describe the calamities and the type of impact affecting the enviroment	O	Drought [IMPACT_____]			
		O	Floods [IMPACT_____]			
		O	Erratic rain/soil erosion, hailstones [IMPACT_____]			
		O	Frost [IMPACT_____]			
		O	Strong Wind [IMPACT_____]			
		O	Crop diseases, specify: [_____][IMPACT_____]			
		O	Crop pest, specify: [_____][IMPACT_____]			

	Score 1. Strongly agree 2. Slightly agree 3. Neutral 4. Slightly disagree 5. Strongly disagree 99. Don't know/No idea	**Information regularly received over the last 2 years (tick)**	**Rank** (Three most important 1=most important)	**Type of weather information**	**Information source** (codes: see further down the page) More than one source is possible
9	Weather infomation is important to farming **Score [_ _]**	O	[_ _]	Forecast of drought, flood, frost or other extreme event.	[_____]
		O	[_ _]	Forecast of pest or disease outbreak	[_____]
		O	[_ _]	Forecast of the start of the rain	[_____]
		O	[_ _]	Forecast of the weather for the following 2-3 months	[_____]
		O	[_ _]	Forecast of the weather for today, 24 hours and/or next 3 days.	[_____]

Codes for question 9

01	Radio	07	Newspaper	13	Other, specify
02	Television	08	Traditional forecaster/indigenous knowledge		_____
03	Government agricultural extension or veterinary officers	09	Local group/gatherings/meetings		_____
04	NGO project officers	10	Religious faith		_____
05	Friends, relatives or neighbours	11	Cell phones		
06	Teachers in local schools	12	Internet		

11. With all the challenges we have discussed during the interview, how do you plan to adapt to the effects of climate change?

12. What type of support would you need as a farmer to enhance your knowledge and experience in farming? What would you like to do but can not do yourself?

F. Final note/ remarks

Final notes / remarks from the respondent

Are there any issues we haven't mentioned or would you like to add anything?

Final notes / remarks from the enumerator

Annex 2: Control sheet for data entry

Control Sheet: DATA ENTRY HOMBOLO – October 2013

HH ID	Name enumerator	Date	Quality Check	Backup
TZ03-01-ZP01-H001	Jeske van de Gevel	10-10-2013	(every 7th case)	(tick if created)

Bioversity International is a global research-for-development organization. We have a vision – that agricultural biodiversity nourishes people and sustains the planet.

We deliver scientific evidence, management practices and policy options to use and safeguard agricultural biodiversity to attain sustainable global food and nutrition security. We work with partners in low-income countries in different regions where agricultural biodiversity can contribute to improved nutrition, resilience, and climate change adaptation.

Bioversity International is a member of the CGIAR Consortium – a global research partnership for a food secure future www.bioversityinternational.org

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